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INTERNATIONAL

AUGUST 1951

VOLUME 26 • NUMBER 8

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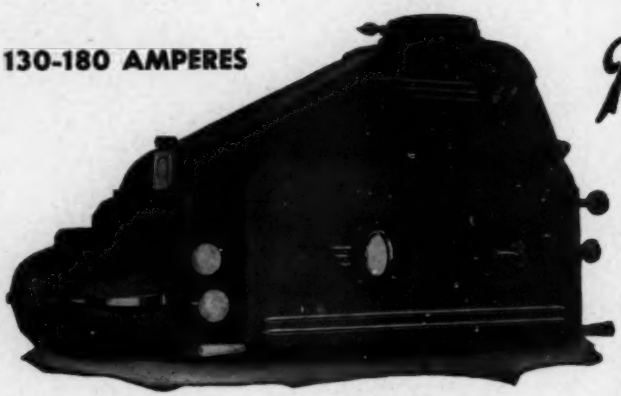

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HENRY B. SELLWOOD, *Editor*

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MONTHLY CHAT

THREE facets of the news, all significant and all interwoven: three-dimensional movies *without* a viewing aid are a reality; competency still is the payoff for the professional projectionist (we have nothing else to sell), and there still are industry-wise people who are adamant in their determination not to sell short the motion picture industry.

Stereoscopic motion pictures have been available to these salary-conscious brains (?) of the film business for several years now. This is a *fact*, disputed by nobody with even average intelligence. The same quality of brains that wrought the miracle of Tv has long been available to those whose innate caution and terrific concern with their annual take ("after me the deluge") has militated against the best interests of the industry which made it possible for them to wear their first clean shirt.

RCA, wise in the ways of finance and trade, announces publicly that it stands ready to invest millions of dollars in the future of the motion picture theater. No philanthrophy here—just sound business sense. Meanwhile, the industry brass sits back and look to somebody else to carry the ball.

Sure, they go through the motions of "exploring" this and that possibility for perking up the movie box-office—but their safaris are strictly of Boy Scout nature. Bilk the exhibitor, cut down the number of lamps on a set, and attend industry functions at the Waldorf-Astoria—these are the contributions of the "brains" of this business.

Nor has Labor been too active in its own behalf: with some 60,000 working men and women dependent upon the survival of the movie industry, Labor has contributed pretty much of nothing to that technological progress which alone can provide security for its own. As for competency—read elsewhere herein how the British purpose providing a steady flow of technical competency. Pretty high standards—yes?

No oracle the writer of these lines, but it must be pretty obvious to even the dolt that concerted action by all branches of the movie industry is necessary in order to keep things on a fairly even keel. Mr. Charles and Mr. Zilch may collect such unconscionable salaries as $900,000 annually—but this serves only to deplete not add to industry resources.

We can dispense with the Mr. Charles and the Mr. Zilch, but we as working people should not stand idly by and see washed away in a wave of incompetency that which provides sustenance for our own. By which we mean that the biggest stake in this business of ours is that of the workers—and if they remain passive, they may now pick their own economic burial ground.

These gloomy-sounding words may be readily transposed to the bright, sunny side of the street if the will to do so is exercised.

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VOLUME XXVI AUGUST 1951 NUMBER 8

The Magic of Color

By ROBERT A. MITCHELL

IV. Color Film Processes

MOST interesting is the modification of the additive color method by the Lumiere Autochrome process, used for making colored transparencies on glass plates. The glass side of a panchromatic photographic plate is coated with a special emulsion containing innumerable tiny grains of starch dyed vermilion, emeraude, and indigo. The plate is placed in the camera with the photographic emulsion away from the lens. All of the light striking the emulsion must accordingly pass through the colored starch grains, which act as filters.

The Autochrome negative, upon development, has everything in reverse, including the colors. So the plate is reversal—processed to turn it into a positive. The white areas are entirely cleared of silver in the positive, just as in an ordinary print on a lantern slide. But white on an Autochrome plate looks white only because these areas are viewed by equivalent quantities of vermilion, emeraude, and indigo light. The colored starch grains remain permanently on the back side of the plate.

A yellowish green leaf appears yellowish green on the Autochrome plate simply because the silver deposit has been removed from behind the emeraude starch grains, but remains behind the vermilion and indigo grains, thus covering up those two colors.

The Autochrome process was adopted by Agfa and called Agfacolor. Instead of starch grains, however, Agfa used colored resin grains. Modern Agfacolor, however, is an entirely different type of process.

This additive process might seem usable for colored movies, but such is not the case. It has two serious disadvantages. It is unavoidably grainy. It cuts down light transmission to such an extent that the clearest whites are really neutral grays which allow only about 25% of the light to pass.

Rigid Tricolor Requisites

Tricolor motion picture processes have to meet two very rigid requirements in addition to the prime requisite of reasonably faithful color reproduction throughout a wide range of light intensities. First, such processes must permit the preparation of a large number of theatre-release prints. Second, the character of the prints must be such that adequate picture illumination can be obtained from existing standard projection equipment.

It is the second of these requirements which definitely rules out additive processes. Only *subtractive* color methods can be used successfully in the professional 35-mm field.

In the days of 2-color motion pictures, Technicolor, with its imbibition method of printing release positives, proved itself the peer of all existing movie color processes. But shortly after the advent of sound pictures, Dr. Kalmus felt that the 2-color process was no longer adequate. He accordingly directed his efforts towards the building of vastly improved Technicolor cameras and processing machinery.

First 3-Color Technicolor

Much scientific research and a large outlay of capital lay back of the first 3-color Technicolor camera and the new processing plant, first ready for use early in 1932. The first production thus filmed was a 2-reel short titled *La Cucaracha*. Walt Disney immediately adopted the new medium. The first full-length feature in tricolor Technicolor was *Becky Sharp*.

There are three ways of filming a Technicolor "separation" negative. The simplest method consists of exposing three frames in succession through vermilion, emeraude, and indigo filters. This method, obviously not suitable for photographing scenes in motion, is confined to the animated cartoon. Three matrix positives are made from the single negative by means of a step printer which prints every third frame of the negative. One matrix, therefore, is the vermilion record, the second is the emeraude, and the third the indigo record.

The standard method of filming in Technicolor involves a special camera which makes use of the beam-splitting principle. But even though three separate negatives, one for each primary color, are made by the Technicolor camera, the beam-splitting device produces only two identical images of the scene being photographed. How then, does this camera produce three negatives?

A prism of special design is positioned directly behind the lens. Part of the light passes straight through the prism

and through an emeraude filter to a panchromatic negative film which records the scene by emeraude light.

The remainder of the light from the lens is reflected at a right angle to form an image of the scene in a second picture aperture. *Through this aperture two negatives run together in "bipack."*

Sensitive Film Layers

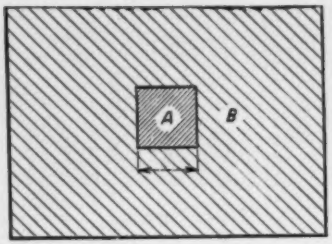
The film nearest the prism has a standard emulsion sensitive only to indigo light, thus becoming the indigo record of the scene. But this film also acts as a filter for the film behind it, and which runs in contact with it. For this purpose the indigo-recording film is backed by a layer of vermilion-dyed gelatine. It therefore acts as a light-filter for the rear film of the bipack, a very sensitive panchromatic negative, which records the scene by vermilion light.

In this way the Technicolor camera, although forming only two picture images, photographs three negatives simultaneously, each negative being a record of the scene in one of the three primary colors.

The third method of filming Technicolor, which is enjoying increasingly wide use, requires only an ordinary one-film motion picture camera and a special "monopack" color negative. How this single negative actually records a scene in full natural color will be described in connection with Agfacolor and Kodachrome.

But no matter which of these three methods of photographing Technicolor are used, three seperate matrix films must be printed, one for each primary. The monopack color negative is usually reversal-processed, converting it to a "direct positive" in full natural color. From this "original" three negative records are made by running it three times through a film printer, a different primary color filter being used in the printer at each operation. Matrices are then printed from the three separation negatives.

The black-and-white matrices are subsequently processed and imbibition-printed as previously described for old-style Technicolor. Each matrix is, of course, printed in the color which is exactly *complementary* to the color of the filter used in photographing the negative from which it was made.



The chromatic adaptation of the eye is very well demonstrated by illuminating a transparent window *A* with a light of a certain color and the surrounding field, *B*, first with artificial daylight, for instance, and then with incandescent light. Shortly after changing over from daylight to lamplight the eye directed upon *A* sees a change of color in the window.

These primary complementaries (secondary colors) are *yellow* (true yellow, complementary to indigo), *magenta* (a decidedly purplish red, complementary to emeraude), and *cyan* (a slightly greenish blue, complementary to vermilion).

Subtractive Process Example

The new Technicolor, like the old 2-color process, is thus a subtractive process. Suppose yellowish green foliage is photographed. Foliage of this color comes out: (1) black on the matrix-positive made from the vermilion-exposed negative, (2) white on the matrix printed from the emeraude negative, and (3) black on the matrix printed from the indigo negative.

In imbibition-printing from these matrices, the foliage is printed: (1) cyan from the cyan-inked vermilion matrix, it is printed clear (no color at all) from the (2) magenta-inked emeraude matrix, and (3) yellow from the yellow-inked indigo matrix. Cyan and yellow superimposed give the true emeraude color of the foliage.

The "subtraction" of colors from the white light of the projector may be described this way: cyan and yellow subtract their complementaries (the primary colors vermilion and indigo, respectively) from the white projection light. Only one primary component of the light remains, emeraude, to pass on to the screen to form an image *in natural color* of the emeraude foliage.

The Printing Procedure

In the actual imbibition-printing of modern Technicolor, yellow is printed first, then magenta, and finally cyan. The printing stock is regular positive film which has previously been printed with the soundtrack and framelines in silver image. The reason why the soundtrack must be in silver is because all the Technicolor dyes, including the cyan, are nearly transparent to infrared light. Although invisible to the eye, infrared affects the modern red-sensitive type of photoelectric cell. A track printed in Technicolor dyes would therefore give very feeble sound.

Hold up a strip of "black" Technicolor film to the light—a fadeout, for example. Instead of being truly black, the film will appear dark red. This shows that the cyan dye, which *theoretically* should cut off *all* red light, transmitting only emeraude and indigo, actually does allow the "low red" to pass. And it is even more transparent to the invisible infrared rays.

Technicolor Print Misalignment

It was formerly the practice to overprint the Technicolor dye-images with a faint silver image to assist the correct balance of color values. Recent improvements in Technicolor make this practice less necessary. As a result, the purity of colors in a Technicolor print is very high, and the over-all color balance practically perfect. Of all the movie color processes, Technicolor reigns supreme.

One minor criticism may be directed

(*Continued on page* 32)

Color Temperatures of Light on the Projection Screen with Various Carbon Arc Projection Systems

Lamp	Carbon Trim	Amperes	COLOR TEMPERATURE Absolute	Fahrenheit
Low Intensity Lamp	12-mm–8-mm Low Intensity	30	3870	6500
Lamp for "Pearlex" Trim	6-mm–5.5-mm "Pearlex"	30	4450	7550
"One Kilowatt" d-c Lamp	7-mm "Suprex" Positive–6-mm "Orotip" C Negative	40	5300	9080
"One Kilowatt" a-c Lamp	7-mm–7-mm "Suprex" Positives	52	5260	9010
		65	5420	9300
Simplified H.I. Lamp	7-mm "Suprex" Positive–6-mm "Orotip" C Negative	42	5020	8580
		50	5060	8650
Simplified H.I. Lamp	8-mm "Suprex" Positive–7-mm "Orotip" C Negative	65	5340	9160
		70	5270	9030

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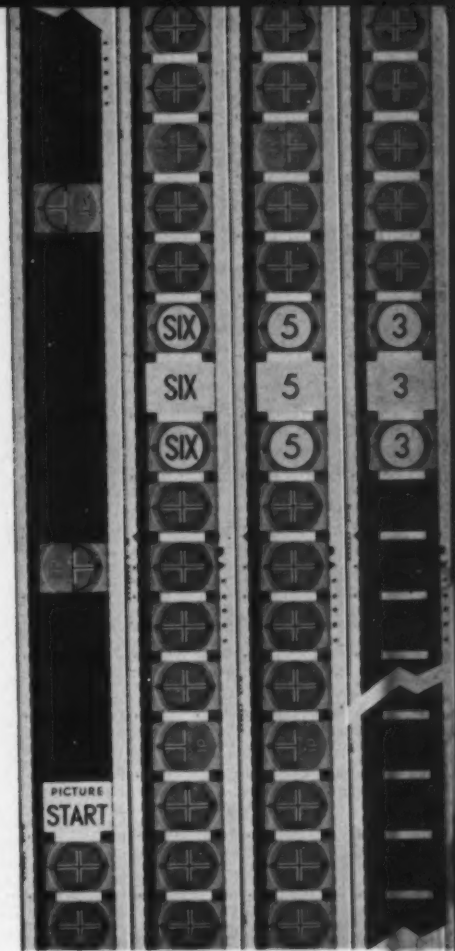
NEW ALL-PURPOSE FILM LEADER†

This proposal for a new film leader has been under extensive and exhaustive tests by an SMPTE committee. Designed to best serve the interests of all film users, in both the theater and Tv fields, a report on this proposed leader is herewith offered for constructive criticism by all branches of the film industry.



SAMPLE FOOTAGE FROM PROPOSED LEADER

Read from the upper left to the lower right; broken edges indicate duplicate frames deleted.

THE Subcommittee on Film Leaders has worked to produce a new leader design retaining all the excellent features of the Academy Leader now in general use, and providing some features which are highly desirable from the viewpoint of a new and growing user of film productions — television. It is believed that this has been accomplished.

Early in the work a purely Tv centered program was abandoned in favor of a broadly applicable design. Since then the leader has been tested by commercial laboratories, professional theater projectionist groups, and equipment manufacturers. Several Tv vision companies have been using the new leader on their recording releases and on certain other Tv films. More than 10,000 prints have been so made and used with excellent results.

It is hoped that all interested persons will consider the proposed leader carefully, use it widely for test and evaluation, and send the Subcommittee their findings. It is the intention that a proposal for standardization shall be made when widespread results warrant it.

Features of the New Leader

The present American Standard Z22.55–1947 is the foundation for the new leader design. Only additions have been made, and only such additions as cause no deletion of past features. Under Z22.55, paragraphs (1) and (2) remain unchanged. Paragraph (3) is changed only as to frame content, and paragraphs (4), (5), (6) and (7) are unchanged.

2.1: The main body of the leader ahead of the three-foot mark is changed from a solid black to an appropriate simple pattern (see illustration). The design is intended to be used in Tv to permit checking system operation before switching into the first picture frame.

The basis of the pattern is familiar to most Tv engineers. A neutral gray background provides a foundation for the pattern proper, which consists of two concentric circles having diameters in the ratio of 4:3, and four arrows whose tips establish the limits of scanning as defined by the SMPTE Tv Test Reel.

Tv Reference Levels

Approximately equal areas of black and white are used to provide reference levels for video gains and pedestal settings. These two limits, together with the background gray, provide a rough check of system transfer characteristic, since the gray value used is approximately centered between the black and white tones. Experience will indicate where the gray level should fall on the wave-form monitor when the system pro-

† J. Soc. Mot. Pict. Eng., May, 1951.

vides best reproduction. The assigned density values of these areas are:

White	0.2 ± 0.1
Gray	1.0 approximately
Black	2.0 ± 0.2

The pattern also provides a secondary indication of scanning adjustment and camera-projector alignment. This will greatly reduce the need for "blind" switching; that is, for switching into a film sequence from equipment having only accidental scanning control settings.

Much of the foregoing information can be gained during the rolling time of a normally threaded leader. In addition, when stop-frame projection is available (its use is rapidly increasing), the projected pattern permits advance check of the entire electrical system, including effects of beam current, edge-light, backlight, etc. Also, the presence of the "average video" information between cue numbers reduces the tendency of the system to "bounce" as the cues go by.

Footage Numbers Changed

2.2: The footage numerals have been changed to project right side up. It has been found that precise Tv program switching has caused these numerals to become of great value to program directors. They can count to their first-frame cue from the rhythm set by the passing numerals, resulting in excellent switching accuracy. Rightside-up projection makes them easier to read for this service. To prevent errors of reading by both production directors and projectionists the "SIX" and "NINE" markers are spelled out.

2.3: The picture threading frame for each 35-mm foot is identical with the old leader, consisting of a full white background with black numerals overlaid. No threading problems are introduced there. However, a single frame, when projected, does not have enough visual effect to permit positive recognition of the numeral; therefore, each numeral is repeated one frame before and one frame after each threading frame, but with the outer portions of the main target design added.

As seen in the illustration, there is no possibility of confusing the threading frame with those added for visual effect. This permits normal threading procedures used in theater projection to continue without modification.

Sound Threading Marks

2.4: The 35-mm sound threading marks have been changed to read in plain English "35 Sound," replacing the previously used diamond mark. No explanation of function is necessary, therefore, for persons unfamiliar with the use of a leader, as was the case before this change. The lettering used is right-side up to the projectionist, and on the side of the film occupied by the sound track. No change in threading procedure is required.

2.5: 16-Mm sound threading marks have been added to define the sound scanning position for that service. As in the 35-mm case, the sound mark reads in plain English and occurs on the side of the film next to the sound track. The leader can thus be used for both reduction printing and contact work without change.

Previously no indication was provided of proper threading for 16-mm use. Yet it has been found that most projectors can be misthreaded. Past practice, in cases of controversy, has been to count 26 frames and mark the sound position with grease pencil. No problems of this sort need occur with the new leader. Of course, the presence of an indication of correct threading position also increases the precision of ordinary operation.

Black Frames Altered

2.6: The black frames following the three-foot marker are slightly changed to a dark gray. The tone value is not altered enough to affect theater projection, but will permit Tv operations to switch into the dark frames without as much "flare" and "black-spot" as now occur. No change in theater practice is required.

The density value used for these frames is approximately 1.6 but may vary somewhat, depending upon printing conditions. In general, the intention is to provide some iconoscope plate illumination to stabilize its operation.

2.7: A small switching cue (see illustration, third frame above lower right-hand corner) has been added in the eighth dark frame before the first frame of picture. The cue is the standard mark used for changeovers but confined to one frame. It is to be used as an indication to Tv directors that the picture will start within normal switching reaction time. Since the cue is very small, occurs only on one frame, and is on a part of the film not normally shown in theaters, it will not affect theater practice in any way.

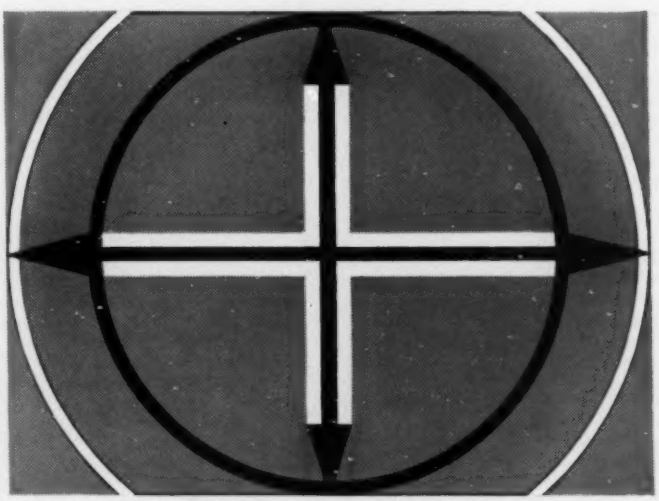
The switching cue also gives a clear indication to a cutter when a particular leader has been used too often, resulting in excessive loss of frames due to splicing. A few frames can be lost without serious consequences, but when their number exceeds four or five, that leader should not be re-used.

Reel Identification

2.8: Reel identification standards have not been changed. It is worth noting, however, that nonstandard practices have grown up, particularly in Tv filmmaking. American Standard Z22.55–1947 defines proper procedures and should be followed rigorously. The proposed leader is carefully designed to supply needed information throughout its active length. It should not be mutilated by slates or special markings in any position other than the standard allows or its usefulness will be greatly impaired.

3.1: Any new thing is strange at first, inevitably. Every effort has been made to reduce this strangeness by retaining unimpaired the previous functions of the leader. But each new function has introduced some new appearance. It is suggested that evaluation be a slow process, with time for all to become familiar

(*Continued on page* 31)



Main body pattern of proposed identification for standard leader.

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DALLAS—Hardin Theatre Supply Co.; Modern Theatre Equipment Co.; Nat'l Theatre Supply Co.
DENVER—Nat'l Theatre Supply Co.; Graham Bros.
DES MOINES—Nat'l Theatre Supply Co.
DETROIT—Nat'l Theatre Supply Co.
FORTY FORT, PA.—V. M. Tate Theatre Supplies
GREENSBORO, N. C.—Standard Theatre Supply Co.
HOUSTON—Southwestern Theatre Equipment Co.
INDIANAPOLIS—Nat'l Theatre Supply Co.
KANSAS CITY, MO.—Shreve Theatre Supply; Nat'l Theatre Supply Co.
LOS ANGELES—J. M. Boyd; C. J. Holzmueller; Nat'l Theatre Supply Co.; Pembroke Theatre Supply Corp.
LOUISVILLE—Falls City Theatre Supply Co.
MEMPHIS—Nat'l Theatre Supply Co.
MILWAUKEE—Nat'l Theatre Supply Co.; R. Smith Co.
MINNEAPOLIS—Minneapolis Theatre Supply; Nat'l Theatre Supply Co.
NEW HAVEN—Nat'l Theatre Supply Co.
NEW ORLEANS—Nat'l Theatre Supply Co.
NEW YORK CITY—Nat'l Theatre Supply Co.
NORFOLK—Nat'l Theatre Supply Co.
OKLAHOMA CITY—Nat'l Theatre Supply Co.; Oklahoma Theatre Supply Co.; The Century Theatre Supply Co.
PHILADELPHIA—Blumberg Brothers; Nat'l Theatre Supply Co.
PITTSBURGH—Atlas Theatre Supply; Nat'l Theatre Supply Co.
SALT LAKE CITY—Inter-Mountain Theatre Supply Co.
SAN FRANCISCO—C. J. Holzmueller; Nat'l Theatre Supply Co.; W. G. Preddey Theatre Supplies
SEATTLE—B. F. Shearer Co.; Nat'l Theatre Supply Co.
SIOUX FALLS—American Theatre Supply Co.
ST. LOUIS—City Electric Co.; Nat'l Theatre Supply Co.
TOLEDO—Theatre Equipment Co.
WESTERLY, R. I.—G. H. Payne Motion Picture Service

CANADA—
Dominion Sound Equip., Ltd., Montreal, Que.
General Theatre Supply Co., Toronto, Ont.
General Theatre Supply Co., St. John, N. B.
General Theatre Supply Co., Vancouver, B. C.
General Theatre Supply Co., Montreal, Que.
General Theatre Supply Co., Winnipeg, Man.
Perkins Electric Co., Ltd., Montreal, Que.
Perkins Electric Co., Ltd., Toronto, Ont.
Sharp's Theatre Supplies, Ltd., Calgary, Alta.

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Stereoscopic Motion Pictures

By J. A. NORLING

President, Loucks & Norling Studios, Inc., New York

A comprehensive summary of the present status of a technical development which has been receiving increasing attention and exploration by the motion picture industry—although mostly on the "thinking" side. The writer is an outstanding authority on the art, his various three-dimensional movies having received world-wide acclaim.

NO GRAPHIC means, beside the stereogram, can substitute for the re-creation of the "real" in a still-life, and in stereo movies realism reaches the ultimate, for they can include movement, color, and action as well as depth. The principles employed in photographing and projecting stereoscopic slides also apply to stereoscopic motion pictures. The same fundamental requirement that each eye sees only the picture intended for it also applies to the moving stereogram.

35-mm Movie Stereoscopy

It seems incredible to many of us who have worked with three-dimensional pictures that the vast motion picture industry does not have a stereoscopic engineering and development research program. The only joint engineering get-togethers are the meetings of the Society of Motion Picture and Television Engineers, and it is at a very few of these meetings that three-dimensional photography processes are presented.

But whenever the subject of three-dimensional films comes up, there is a remarkable response from the members present, and also from the press. The art of stereoscopy has "sex appeal," but it seems to have escaped the concentrated attention of most of the people in the Hollywood area. The men in the drivers' seats of the movie industry have, for the most part, failed to have a vital personal interest in and understanding of three-dimensional movies.

Formidable Competition to Tv

That the industry could use something to combat television's capture of more and more of the theatre audience is undeniable. Stereo movies might well induce people to return to their former favorite amusement. But the return is likely to come about in the mass only if the film theatre gives them something they can't get on a 17-inch Tv tube, namely the ultimate in photographic realism, the stereoscopic movie in full color, with all the dramatic possibilities that are only waiting to be appreciated.

The enthusiastic public reception given some earlier stereo movies and the dollar profits from these movies are a matter of record. Newer, better stereo techniques are now available, and the reason for introducing them was never more pressing. Will the motion picture industry take action?

Early Anaglyph Process Films

One of the early and noteworthy theatrical exhibitions of stereoscopic motion pictures occurred in 1924, when J. F. Leventhal produced a few "shorts" utilizing the anaglyph process. There followed an eleven-year lull in the use of stereoscopic films.

Then, in 1935, Loucks and Norling Studios and Mr. Leventhal jointly produced a series of short films again employing the anaglyph principle, this time in talking picture form. These films, which were called "Audioscopiks," were released by Loews, Inc. and proved to be some of the most successful short subjects ever issued, winning not only domestic acceptance but an unprecedented play in the foreign field, notably in France, Spain and Great Britain.

That their success should have indicated further pursuit of the anaglyph process seems logical. But the producers had, from the beginning, realized the inherent limitations of the anaglyph process and concluded that films exhibited by that process would only be adequate as novelties and would never be tolerated for full-length feature releases.

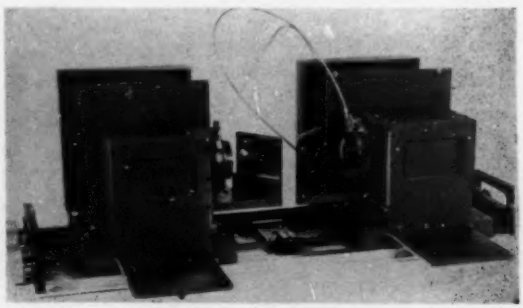
'Retinal Rivalry' Induced

This conclusion was arrived at by a recognition of the visual "insult" resulting from the projection of one color to one eye and its complementary to the other. This sort of delivery of images, one color to one eye, another to its mate, produces "retinal rivalry" and brings on physiological disturbances that may induce nausea in some observers if they look at the anaglyph longer than a few minutes.

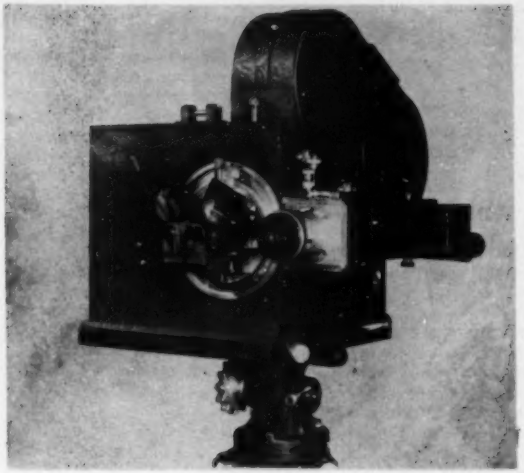
Since this process—the anaglyph—has played an important role in the advance of the stereoscopic art, it would be well to describe it here briefly. Its invention is credited to Ducos du Hauron, who applied it in 1895, although there is some evidence that its possibilities had been explored many years before that.

The Viewing Process

In one form, the anaglyph images are on two separate films. One member of the stereoscopic pair is projected through a filter of one color, the other through a filter having a color complementary to that of the first. In another form, the one that was used for "Audioscopiks," the anaglyph images are printed in complementary colors directly on film and



The Norling three-dimensional camera for stills. It has provision for variable lens interaxial and convergence.



Front view of the Norling three-dimensional motion picture camera, showing variable interaxial optical system in front of the two lenses.

projected in a standard projector without filters.

The projected images are viewed with spectacles having windows of the same colors as the colors on the screen. Red-orange for the right eye filter and blue-green for the left are often used. The right-eye red-orange filter in the viewing spectacle renders the blue-green right-eye image in monochrome and the left-eye blue-green filter renders the red-orange left-eye image also in monochrome.

Since dyes and pigments hardly ever are capable of transmitting only the color they are supposed to transmit, there is rarely a complete "cutting" of one color: some of it always comes through so that part of the blue-green image which is supposed to be blocked by the blue-green spectacle filter leaks through, producing a "ghost" image. So, in reality, the one eye sees a part of the image intended for the other; the "part," of course, being defined as a very dim, but still discernible remnant of the whole "other-eye" image.

Good picture quality has never characterized the colored anaglyph. This and other shortcomings make it eligible for discard as a practical system for motion picture features.

Since the introduction of Polaroid light-polarizing filters it is possible and practical to substitute these for the red and green filters of the original anaglyph process. Strictly speaking, the polarized light method may be defined as another form of the anaglyph. Actually, Polaroid Stereoscopy would be a good name for it. It was Dr. Edwin H. Land, head of Polaroid Corp., and his invention of the first practical and efficient synthetic polarizer which hastened the increasingly widespread use of the present satisfactory methods of stereoscopic projection.

World's Fair (1939) Film

The first large-scale public exhibition of a stereoscopic motion picture with excellent picture quality took place in 1939 at the New York World's Fair. That year a black-and-white film was shown. The following year a similar subject was exhibited in Technicolor. More than five million people saw these films,* and they're still talking about them. Some of the production and exhibition problems posed by these pictures are interesting to consider.

The camera assembly for the black-and-white picture consisted of two Bell and Howell professional 35-mm cameras mounted so that one was "upside down" in relation to the other. This was done so that the lenses could be brought close together.

Even with this arrangement, the interaxial was not ideal. It was fixed at 3¼ inches, although calculations showed that some scenes actually required as close as 1½ inch interaxials. But no such camera was available then, nor was there time to have one built. However, a complete set of matched lenses of different focal lengths effected a quite satisfactory compromise with the ideal.

*Produced by the writer.

'Stop-Motion' Photography

The greater part of the picture was a sort of phantasy, showing the parts comprising a Plymouth car dancing around and assembling themselves. Their movements were in synchronism with music and required the use of "stop motion" photography, that is, "one frame-at-a-time" shooting.

But a substantial part of the film contained "live action" shots taken in the foundry and shops and along the assembly line. The narrator for the film was Major Bowes of Amateur Hour fame. He appeared in "live action" in one sequence in which he spoke. This was the first "live action-live dialogue" shot ever made in a stereoscopic presentation. It created some difficult problems since the cameras would not fit into any available studio "blimps." However, the sequence was shot without any parasite camera noises being recorded.

Dual Projection Set-up

Since the Chrysler film was shot in a two-camera setup, and no special photographic and projection facilities for single-film handling was available, it was necessary to project with two projectors. A rather complex Selsyn motor drive was used for interlock, although a much simpler synchronization could have been attained by a straightforward mechanical linkage, such as we used for the

Rear view of the Norling camera, showing "racked-over" position for lining up a scene through the binocular view-finder. Camera contains built-in spirit level and footage counter.

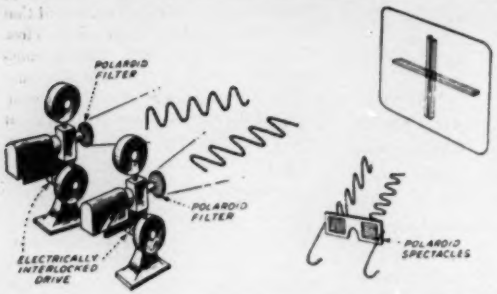


Diagram of a double projector installation using Polaroid filters on the projectors, plus viewing spectacles.

Pennsylvania Railroad's stereoscopic movie display at the Golden Gate International Exposition in San Francisco in 1940.

A Technicolor film, using the stop-motion technique was our next stereo production. A unique filter attachment was arranged in front of the camera lenses. The filters were mounted on wheels which rotated together. Color balance was attained by making sectors having angular dimensions calculated to pass the quantity of light required for each color and as demanded by the sensitivity of the film.

The "A" (red) filter passed light to which the film was more sensitive than that passed by the "B" (green) and "C5" (blue) filters. Consequently the red filter had the narrowest opening of all, and the "C5," to whose transmission the film was least sensitive, had the widest opening. The exposures were made by the alternate frame method of color separation. Three frames, one the red record, one the green, and one the blue, were made instead of one frame as in ordinary photography.

These separation negatives were used by Technicolor to make the printing matrices from which the dye imbibition prints were produced.

Two Separate Films Advocated

It has always been the writer's opinion that the stereoscopic camera for professional use should be built to take the images on two separate films. This is to afford the greatest flexibility in the studio and to permit the use of short focus lenses and to facilitate the making of optical effects in the duplicating processes.

One such camera was built. It contains the features deemed essential to a versatile camera. The most important are a variable interaxial and a convergence control, but important too is a binocular finder showing in miniature a three-dimensional view of the scene to be photographed. Visual inspection during focusing seems superior for stereoscopic work and focusing is easier when the view is seen in three dimensions.

The binocular view finder has an additional advantage: it enables the cameraman to compose the scene stereoscopically, using the interaxial and convergence controls, manipulating them until he gets the best possible arrangement. He can increase the interaxial if he wants to increase the apparent depth of the scene. He can reduce it if nearby objects demand it.

The dual projector system used at the New York and San Francisco Fairs is substantially the same as that currently on exhibition at the Festival of Britain. According to press reports, it is also the same system which has recently been demonstrated by Natural Vision Corp. of Hollywood.

Dual Images on One Film

Systems for stereoscopic films using dual images side by side or one above the other have also been proposed. One of the problems in the two-image arrangement, whether in tandem or side by side, is the loss of light, because the light-covering circle covers a large area around the area occupied by the two images.

The ordinary circular light spot from the projector arc spills light all around

(*Continued on page* 28)

'Natural Vision,' Latest 3-D (?) Entry

HOLLYWOOD is currently excited by another seeming palliative for the drooping box-office —three-dimensional films, of all things. This latest wide-eyed wonder (of a temporary nature, of course) is the effusion of Natural Vision Corp. which, employing age-old technical knicknacks, comparatively speaking, promises to open up the road to the Promised Land. As reported, Natural Vision goes like this:

The only special equipment necessary to photograph a picture in the Natural Vision system includes a housing which holds two standard cameras facing each other. They receive their images from two mirrors mounted between their lenses in a V and separated by the normal distance between tne human eyes.

The mirrors can be adjusted to angle so that the point of optical convergence will correspond to any focal point at which the cameras are set. Each camera takes a complete negative which may be used to produce standard two-dimensional prints for normal exhibition anywhere.

Special Viewing Aids

The three-dimensional effect require the use of two prints, one from each negative, two projectors *simultaneously*, and polarized spectacles for audiences. Transparent gelatins of opposite polarization immediately in front of each projector polarize the beams, which are adjusted to proper convergence on the screen and the viewer equipped with corresponding glasses sees one image with one eye and the other image with the other eye. Consequently, he experiences normal depth perception. The system will work either in color or black-and-white.

Disadvantages of System

Its disadvantages are several. For continuous screening without interruption for rewinding, a theater must use *four* projectors instead of the standard two. The system will work only on a metallic-surfaced screen, and many theaters are equipped with porous screens, replacement of which would cost about $200. And, finally, the exhibitor must buy spectacles for his patrons at a cost of five to ten cents a pair, and the patrons must be persuaded to wear them.

Nevertheless, says Natural Vision, the obstacles are by no means insuperable in big, first-run theaters, which normally have three projectors anyway. In situations where innovation is impractical, hopefully explains Natural Vision, a single print can be used to show the picture in the regular two-dimensional form.

Readers of IP will recognize in the foregoing much that is old-hat technologically, and this impression will be strengthened after a reading of the adjacent exposition by J. A. Norling.

Training British Projectionists

BASIC outlines of a program for training British projectionists, as agreed upon by the exhibitors (C.E.A.) and the union (N. A. T. K. E.) have been made available to IP through the courtesy of our good friend and colleague, R. Howard Cricks, editor of the technical section of the *Ideal Kinema* (London).

The plan will be administered by local committees of CEA and NATKE. All apprentices must be at least 16 years of age, and except with the approval of the local committee they must not be more than 17. Apprentices shall be indentured for four years, of which six months shall be considered a probationary period during which the indenture may be terminated by 14 days' notice on either side.

Deferment of military service will, it is hoped, be obtained for apprentices. They shall attend technical classes which, if held during working hours, shall be attended without loss of wages to the apprentice

Successive Steps in Time

At the end of the indenture (four years) the apprentice shall take an examination which will qualify him as a projectionist. A further 12 months' experience will qualify him for another examination as a "second" (next highest rating), and after another 12 months he may take an examination as "chief" (top man in a projection room).

Provision is made for existing "chiefs" or "seconds" with the requisite experience to be issued certificates of competency without examination; while other projectionists over the age of 21, with more than six years experience, may take an examination for the certificate of a "second." The examinations will be administered by the Ministry of Education (governmental) and the British Kinematograph Society.

Mr. Cricks, having spent the World War II years in charge of training of about 1500 Army projectionists, has some very definite notions as to the curriculum and the locale and manner in which it is to be conducted. Excerpts from his published views are appended hereto:

Centers of Training

"First, a practical point: where are the training courses to be held? The obvious suggestion is at the numerous technical institutes which are to be found in all towns. It may be argued that classes could as well—or even better—be held in a vacant room at some theater, but in such a case the problem of instructors is intensified, the while a valuable attribute of the instruction will be lost—the scholastic atmosphere and technical and social amenities of the teaching institute. These, I urge, are points that must not be overlooked.

"As against the technical institute there is a strong argument: there is in such institutes a natural tendency for instruction to be scholastic in nature . . . which would be quite out of keeping with the present scheme. Even with youths whose educational background enables them to follow the accepted theoretical and mathematical approach to subjects, I have found a tendency to lose sight of the practical aspects in a fog of theory.

"Electricity, for instance, becomes not a living practical science but a mysterious natural obedience to obscure mathematical formulae. We must face the fact that the standard of education in our elementary schools just does not enable youths attending a class probably one half-day a week to cope with instruction of a type which may be very suitable for full-time students of matriculation standard.

Training Army Projectionists

"As an example, let me describe how we taught Army projectionists the rudiments of electricity—and remember that after six weeks of primary instruction and a further two weeks of practical tuition they were expected to become qualified projectionists, capable, under supervision, of putting over a show and of maintaining equipment. The majority of these men had had no prior experience of projection, and their standard of education varied from illiterates (quite literally we had several who had to be taught to read and write) to university students.

"We had a number of so-called meter boards made up. Each board carried a voltmeter and ammeter, open fuses, a d-p switch, a variable resistor, and terminals for attaching separate resistors, either in series or parallel. Half a dozen of these boards were fed from a battery of a dozen cells.

The first thing students were shown was how, when the terminals were shorted, the fuse blew. Next they were taught to read the meters and to notice roughly at what current the fuse blew, and also that the voltage was immaterial. Then they were given several fixed resistors of marked value which were connected up in series; a number of tests were made with different voltages and different resistance values, and from these tests many of the students derived Ohm's Law for themselves.

"Not until this stage was reached was the simplest mathematical treatment attempted. But from then on it was possible to tackle series and parallel calculations with the assurance that students really understood what they were doing.

Learning From Practice

"Since the majority of Army projectors, both 35- and 16-mm, used filament lamps, few of the students were taught anything about arc lamps. But those few classes who had to cover this subject learnt the theory of the arc from practical experience, and not *vice versa*. By means of meters they discovered how some of the volts were absorbed in the ballast and some in the arc, and saw how the proportion altered as the carbons were jammed together. Similarly, the principles of optics were taught by tracing the refraction of rays through prisms or half-lenses.

"This method of tuition is foreign to the normal technical institute. Yet I consider it essential that it should be adopted if youths are not to regard classes as dry-as-dust instruction, divorced from the realities of the projection room.

Selection of Subjects

"Next, what subjects are to be covered in the syllabuses of the three courses, the apprenticeship course, the second's course, and the chief's course?

"I am not contradicting what I have before said if I insist that mathematics must be an essential part of all these courses. The apprentice during his four years' training must progress far enough to have facility in the handling of decimals and fractions, and a smattering of the principles of algebra and geometry. The second should have a knowledge of logarithms and decibels. For the final course the embryo chief should find sufficient mathematical practice in his other studies.

"In electricity the apprentice must become familiar with D.C. calculations and touch upon A.C. and also learn the electrical aspects of sound reproduction. The following two years must include A.C. calculations and a survey of the principles of all the electrical equipment and wiring of the theater. Other subjects of

(*Continued on page 27*)

R. H. Cricks in New British Post

R. Howard Cricks, many of whose extensive contributions to the technical literature on sound motion pictures have appeared in these pages, has resigned as technical adviser to the British Kinematographic Society and as editor of its *Journal* to become a director of Marsland Publications, Ltd., of London. This company specializes in technical books, catalogs, etc., for the photographic, movie and Tv industries.

Mr. Cricks will continue as editor of the technical section of *Ideal Kinema*, British film industry journal.

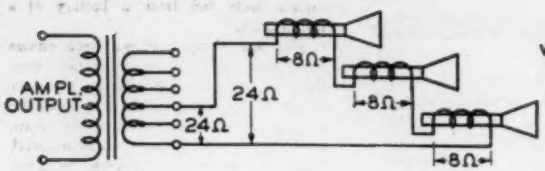


FIG. 1. When three 8-ohm loudspeakers are connected in series, the total impedance will match that of a 24-ohm tap.

The Matching of Loudspeakers

An excerpt from the book "Installation and Servicing of Low Power Public Address Systems," by John F. Rider, publisher, 480 Canal St., N. Y. City 13.

THE *matching* of one component to another in a public address system is very important. A bad match between a good amplifier and a loudspeaker will give poor results in terms of power output and fidelity.

Given an output tube having a stated plate circuit impedance, it is necessary that the loudspeaker voice-coil impedance match the impedance of the plate circuit. For the best possible fidelity, the source and load impedances should match within about 10%.

The impedance of a loudspeaker is the impedance of the voice coil and is always included in loudspeaker specifications. This impedance, which is equal to the voltage across the moving coil divided by the current through it, is given at a particular frequency, usually 400 cycles. Voice-coil impedances generally range from 2 to 15 ohms, with most between 6 and 8 ohms; however, in special loudspeakers it may be as much as 50 ohms.

Range of Impedances

When loudspeakers are directly connected in various types of series, parallel, or series-parallel combinations, the impedance offered by the total load may be anywhere from 0.1 ohm to 500 ohms in commercial practice.

Generally when the distance between the amplifier output transformer and the loudspeaker is about 200 feet or less, the line can be run at the impedance of the voice coil. The term "line impedance" as used here does not refer to any characteristic which the line itself has but means that the conductors are connected to a load of that type impedance. Thus, a low-impedance line means that the wires are connected to a low-impedance load. Any combination of loudspeakers can be connected by a low-impedance line.

Matching on Low-Impedance Lines

The total load impedance offered by two or more loudspeakers connected in series is the sum of their individual impedances. This total load can match the amplifier output by connecting it across the same value of tap impedances. Thus, if three 8-ohm loudspeakers are series-connected, matching is secured by connecting the entire load across a 24-ohm tap on the output transformer as shown in Fig. 1.

The total load impedance offered by two or more loudspeakers connected in parallel, when all have the same voice-coil impedance, is equal to the impedance of any one loudspeaker divided by the number of loudspeakers. Thus, if four 8-ohm loudspeakers are connected in parallel, the total load impedance $Zr = 8/4 = 2$ ohms. For proper matching, the loudspeakers should be parallel-connected to a 2-ohm tap on the output transformer as shown in Fig. 2.

The total load offered by four or more loudspeakers connected in series-parallel, when all have the same voice-coil impedance, is equal to the impedance of any series branch line, divided by the number of such series lines that are in parallel.

If four 8-ohm loudspeakers are series-parallel connected so that there are two loudspeakers connected in series in each branch and two branches in parallel, then the effective load is $16/2 = 8$ ohms. This load should be connected to an 8-ohm tap for proper matching, as shown in Fig. 3.

Matching on High-Impedance Lines

Where several loudspeakers are situated at some distance from the amplifier and from each other, then each loudspeaker (or group of loudspeakers) can be matched to a 500-ohm line (or other high impedance) by means of an individual transformer having a primary impedance such that in combination with the other individual transformer primary impedances the total load is 500 ohms (or equal to the amplifier tap impedance used).

Four loudspeakers in series-parallel using two matching transformers, or nine loudspeakers in three series-parallel groups using three matching transformers, can each be connected so as to

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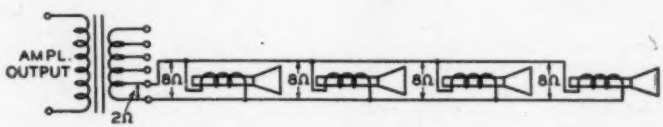


FIG. 2. Four 8-ohm loudspeakers connected in parallel will match the impedance of a 2-ohm tap.

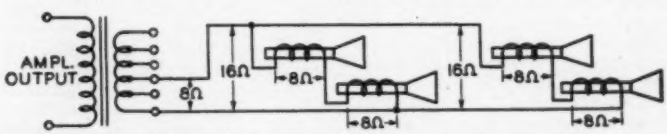


FIG. 3. When four 8-ohm loudspeakers are connected in two parallel branches of two series-connected loudspeakers each, the total load impedance will be 8 ohms.

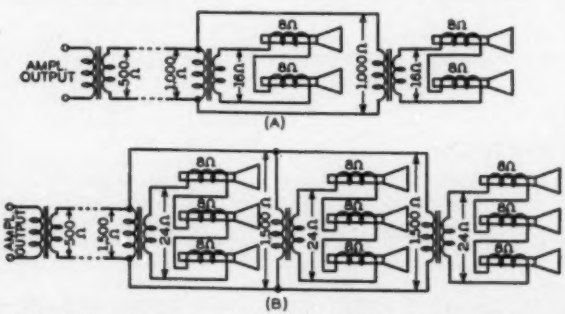


FIG. 4. Low-impedance loudspeakers can be connected to a high-impedance amplifier in many ways using line matching transformers. Parts (A) and (B) illustrate two such possible configurations.

Carbon Arc Copper Salvage

THE National Production Authority, charged with the conservation and allocation of critical materiels essential to the defense program has announced (Aug. 2) a program for the salvaging of copper coating dripping from the carbon arcs used in practically all motion picture theaters in the United States. No mention was made of similar action by Canada.

The program involves the collection of the drippings by projectionists in every theater, studio, and exchange—in fact, wherever a carbon arc is in operation. The carriers who deliver film to the theater will collect the drippings and, without charge, turn them over to a "designated" theater equipment dealer in each film distributing city. The latter will periodically sell the drippings to an "authorized" metal scrap dealer.

Estimate 100,000 Pounds Salvage

It is estimated that approximately 100,000 pounds of copper can be salvaged annually by this program. NPA emphasizes that the success of this program may well insure the industry getting enough copper-coated carbons to maintain full operation.

Cooperating in the program are the following industry organizations: IATSE, film carriers in all territories, National Theater Supply Co., Allied States exhibitors group, Theater Owners of America, TESMA and TEDA (manufacturers and dealers associations, respectively); Motion Picture Assoc. (producers) and the Variety Clubs International.

All money collected from the sale of such drippings will be turned over to the Welfare Fund of the local Variety Club. The chairman of the Welfare Committee of each Variety Tent will assume the responsibility for supervising the operation of the program with the film delivery service and the equipment dealer in each film distributing territory.

Procedure for the various cooperating groups is outlined as follows:

Projectionists

Collects copper drippings from projector carbons in arc lamphouses.

Place copper drippings in container (*avoid mixing stubs therein*).

When container is filled, see that it is picked up by film carrier to be delivered to "designated" theatre equipment dealer.

In film distributing cities, certain theatre owners may prefer to have filled container delivered to the theatre equipment dealer from whom he buys his projector carbons. There is no objection to this procedure.

Theater Owners, Managers

Cooperate with projectionists to collect copper drippings from projector carbons in suitable containers.

Either see that filled containers are given to film carrier for delivery to "designated" equipment dealer or deliver same to dealer from whom you buy projector carbons.

Film Carriers

Pick up containers filled with copper drippings from any theatre served by carrier.

Deliver container to "designated" theatre equipment dealer in film distributing city.

Dealers Not 'Designated'

Where theatre owner delivers filled container of copper drippings to you, accept same and periodically deliver accumulated drippings to "designated" equipment dealer.

If such is not convenient or practicable, notify your Variety Club when you have accumulated 100 pounds or more of such drippings and he will assist in disposing of them.

'Designated' Equipment Dealer

Accept filled containers of copper drippings delivered to you by film carriers and theatre owners and other theatre equipment dealers.

When you have accumulated several hundred pounds of drippings (not less than 100 lbs.) notify the Variety Club.

Cooperate with Variety Club in disposing of copper drippings to authorized metal scrap dealer who will pay the Variety Club the most money for them.

During World War II a similar copper dripping salvage program was carried on. In some instances, however, difficulty was encountered because the copper drippings do not look like copper. They are black in color, due to the presence of small amounts of copper-oxide, although analysis shows the true copper content to be in the range of 94%. Scrap dealers hesitated to purchase copper salvaged by theatres for these reasons and also because the quantities offered seldom exceeded 50 pounds.

The full-scale publicity program now in progress is expected to iron out this and related shortcomings of the last campaign.

MATCHING LOUDSPEAKERS

offer an impedance equal to that of the line. Fig. 4 illustrates line matching of the aforementioned series-parallel connected loudspeakers. It will be noticed that the matching transformer secondary impedance equals the load connected across it.

NPA Building Limit Lifted

The amended National Production Authority construction order, M-4A, lifts the limitation of $5,000 on theater building costs, it was confirmed by NPA officials on Aug. 13. Under the amended order theater construction work can be started until Oct. 1 without any limit on the amount of materials used.

An application for a permit must be obtained after that date only if completion of a project will require the use of more than two tons of carbon steel, or 200 pounds of copper, or any quantity of aluminum alloy steel or stainless steel. There will be no limitation on the amount of other materials that can be used after Oct. 1.

An exhibitor can start a project before Oct. 1 no matter how much carbon steel, copper, aluminum alloy or stainless steel is called for provided those materials already are on hand. Applications for more than two tons of carbon steel, 200 pounds of copper or any quantity of aluminum alloy steel or stainless steel after Oct. 1 must be made on Form CMP-4C and Form NPAF-24A.

The opinion was voiced in equipment industry circles that the amended order will permit the construction of a large number of drive-in theaters providing the limitations on metals listed in the order are not exceeded. 200 pounds of copper suffice a drive-in for 10,000 feet of underground cable, enough to take care of 600 cars.

4th Movie Tv Fight Telecast

Reaction to the fourth in a series of exclusive theater presentations of boxing attractions proved strong enough this time to warrant further offerings, based on a roundup of box office figures at the 15 theaters which carried the Joe Louis-Jimmy Bivins fight.

Fight, a routine affair in which Louis bested his opponent in slow methodical fashion, could not provide a fair yardstick of audience reaction. However, as a test of the public's willingness to come out to see a fight at a New York theater, the experiment proved a success. With the fight outside of the Metropolitan area for the first time, six local houses were permitted to telecast the fight: of these, four played to overflow crowds, despite a heavy downpour from 8 to 9:30 p.m.

Theaters experiencing the biggest siege at the box office were the Warner Theater in Times Square, and RKO"s Fordham in the Bronx. At the latter, crowds were turned away after 8 o'clock.

Now...RCA ready

TO STAKE MORE MILLIONS

in your Theatre Business

Offers this bold plan to help you modernize now on low-cost Credit Deal

Effective Immediately: For *you*, the theatre owners, RCA now makes available *additional millions of dollars* in new credit financing in an all-out effort to give you the theatre equipment you need to *modernize right now for better house appeal, bigger grosses!*

This offer to *stake new millions* in helping you modernize your theatres tells you in the most positive terms that **RCA has boundless faith in the future of the theatre business.**

Included in this great RCA Theatre Modernization Plan is virtually every item now carried by your RCA Dealer: projectors, lamps, power supplies, sound systems, screens, chairs, carpets, air conditioning. All the things *you need right now* to give your theatre *greater house appeal for more pulling power.* All available on early delivery. All yours on low-cost, long-term, easy RCA credit under this broad Modernization Plan.

Your own RCA Dealer has full details. He's all ready to *work with you* . . . to help you in every possible way to get what you need for *modernizing your theatre immediately* . . . to help you *actually do something now about winning bigger box office with better house appeal.*

You profit these 9 ways with new RCA Plan

1. You gain greater house appeal

This has already been proved by hundreds of recently modernized theatres that are outpulling less attractive houses. Equally important, your *modernized* theatre offers the increased entertainment value that could possibly command a *higher admission price* (more in line with today's higher operating costs).

Prove all this for yourself. Visit the nearest modernized theatre. Check the gate. See how much *better than average* a modern house can do. Then do likewise.

2. You are ready, come war or peace

If we do get into a major war, your *modernized* theatre is ready for the long, tough hours of operating . . . ready to serve again as morale builder for war workers. Ready with *new* equipment . . . *precious equipment you may not be able to get in wartime.*

If we just go on building defenses, your *modernized* theatre is still getting its *extra* share of business through greater house appeal.

So you win either way if you modernize now.

3. You are ready for theatre TV

As theatre-TV develops, your house still needs good sound, screen, seats, carpet, and air conditioning. *Theatre-TV can't change these basic needs.* What's more, your house still needs good projectors and lamps. Because theatre-TV is an *addition, not a successor,* to movie film.

4. You improve your competitive position

By modernizing now, you take an important step to *win and hold* a bigger share of patrons, not only for the present, *but for the years ahead.* Only by offering *better and better* facilities to the public can you hope to improve *(or even maintain)* your position. So *modernize now.*

5. You get plenty of modernization under current NPA rules

NPA regulations are still liberal in allowing you to modernize your theatre. You can add or replace booth equipment, sound, screen, chairs, carpet, ductless air conditioning, and much miscellaneous equipment. *And virtually all of these items are available under this helpful RCA Theatre Modernization Plan.*

6. You let credit work for you

You get practically everything you need for modernizing your theatre, all for a *modest cash outlay.* Balance is on a long-term, low-cost contract set up to fit *your* requirements.

7. You save on today's equipment prices

You know that the defense effort and the threat of war may push prices higher. So act now and save at today's prices.

8. You save on valuable tax deductions

If in your modernization program, you scrap any equipment or furnishings that aren't fully written off, you can deduct the undepreciated portion on your tax returns and gain an important saving. Ask your tax advisor.

9. You gain a million dollars worth of cheer

What's more important than getting a little *joy* out of your business? The kind that comes from operating a clean, attractive, *modern* theatre that's *pulling in the patrons!*

Give yourself a break. You only live once. Get up out of the doldrums. Get busy on housecleaning. Get happy. Go modern. You gross a million dollars worth of pride and self-satisfaction when you run a house *that's ready to pull 'em in* with greater house appeal.

Follow these 4 Simple Steps to modernize now

Step 1:

Look at your theatre *critically* (the way your patrons do). Make an actual list of items you need to bring it up to date: new projection and sound equipment, screen, chairs, carpet, air conditioning.

Step 2:

Call in your helpful RCA Dealer. Let him help. You'll find he can furnish you with virtually every item you need. All on early delivery. All on this broad, new RCA Modernization Plan.

Step 3:

Now get down to brass tacks. Find out how *little* cash it actually takes to get delivery on nearly everything you need to modernize your theatre right now. You'll find your RCA Dealer will *work with you on this. He will try to work out the deal that is best for you.*

Step 4:

Make the modest cash payment, take what you need and *get going.* Make a clean sweep. Perk up your projection, sound, screen. Reseat. Recarpet. Dress up your front. *Then bally-hoo it all over town.* And start reaping the quick rewards that modernization pays.

Pick up your phone . . . ***Call your RCA Dealer . . . Get going now.***

Why your credit is so good with RCA

You theatre owners have earned a lot of valuable credit here at RCA. Because you pay your bills.

In the past 22 years, you have bought many millions of dollars worth of RCA theatre equipment . . . *mostly on credit.* Your record for payment is almost perfect.

This is another good reason why RCA is willing to help you modernize with long-term, easy RCA credit. *You have earned this confidence.* So use this good credit to modernize now.

Are you competing for 1951 patrons with a 1936 Theatre?

Competition can be tough when your house is out of date. And most theatres haven't been modernized since 1936 . . . 15 years ago! They have fallen far behind in the parade of progress.

Remember: in business you never stand still. Either you move forward or you move backward.

So *now as never before* is the time to move forward again . . . to get up to date with a clean modern attractive hard-pulling house.

Modernization is so simple under this new RCA Plan.

You get *greater house appeal for better grosses.* You're *ready, come war or peace or theatre TV.* You *improve your competitive position.* You get *plenty of modernization under NPA rules.* You *let credit work for you.* You *save on present prices and you save on tax deductions.* And best of all, you *gain a million dollars worth of "happier outlook on life"* by modernizing now.

Don't delay another day. Call your helpful RCA Dealer and get started *right now!*

Offer May Be Limited . . . Act Now

Restrictions and shortages may curtail this RCA Theatre Modernization Plan at any time! So please do not delay. Call your RCA Dealer and reserve your share of this available equipment . . . now.

Get Full Story . . . Mail Coupon Today

Are you worried about the future of your Theatre Business?

These facts may give you new confidence.

RCA, more than any other company in America, knows the interrelations of theatre business, theatre television, and home television. Because RCA pioneered in all three fields.

Armed with all this knowledge, RCA stands ready to pour more millions of dollars into the theatre business right now! Because when all the facts are known, the future of the theatre business still looks good.

THEATRE EQUIPMENT

RADIO CORPORATION of AMERICA

ENGINEERING PRODUCTS DEPARTMENT, CAMDEN, N.J.

In Canada: RCA VICTOR Company Limited, Montreal

Want More Information? For full story on this great new RCA Theatre Modernization Plan, just clip and mail coupon . . . *today.*

Theatre Equipment, Dept. 63T
RCA Engineering Products
Camden, N. J.

Without obligation, please give me full story on the broad, new RCA Theatre Modernization Plan which will make available my share of the additional millions of dollars in credit financing to help me modernize my theatre now.

Name_____

Position_____

Address_____

IN THE SPOTLIGHT

By *HARRY SHERMAN*

IN RECENT issues we have been giving tips on Social Security benefits, as culled from official sources. Although a booklet outlining these benefits in detail is available from the nearest SS office, requests for further data continue to arrive at our office. So here goes with what we think should be the final instalment of this series in this department.

Reference has been made to the terms "fully insured" and "currently insured." A fully insured person is one who has 40 "quarters of coverage." That is, if you have had SS earnings of at least $50 a quarter in at least 40 calendar quarters (equivalent to 10 full years). A "calendar quarter" is any three-month period ending March 31, June 30, September 30, or December 31. These don't have to be consecutive.

Under the new amendments, a person also is fully insured if he has SS earnings in at least half of the calendar quarters between January 1, 1951, and the date he becomes 65. However, the minimum is six "quarters" of coverage.

A currently insured person is one who has at least six "quarters" of coverage during the 13-quarter period before reaching 65, or dying.

All benefits paid under SS, it can be seen, hinge on the primary insurance amount. In the 1950 amendments, a new and simpler method of figuring payments is provided, which may be used when you have had a year and a half of work under the law after 1950. Under it, if you average $100 or less in monthly earnings after 1950, your own retirement payment will be half of your average wages. If you average from $100 to $300 a month (the maximum for insurance purposes), your payment will be between $50 and $80 each month.

The new formula is used by those who reach age 22 after 1950, and who have at least six quarters of coverage after 1950. Those who reach age 22 during 1950 or before, and who have at least six quarters of coverage after 1950, will use either the new formula or the old one, whichever gives the larger benefit. Those who don't have at least six quarters of coverage after 1950 must use the old formula and the "conversion table" provided.

The new method calls for the averaging of monthly income (up to $300 a month) taking 50% of the first $100 and adding to it 15% of the remainder.

Suppose, on reaching 65 in January, 1955 your total wages from January, 1951, to December, 1954 (48 months) were $11,040. Your monthly average would be $230. Fifty percent of the first $100 is $50. Adding 15% of the remaining $130 ($19.50), your total old-age insurance will amount to $69.50.

For more than 12 years your pay envelope was a penny on the dollar lighter. Commencing January 1, it was a penny-and-a-half lighter. From 1954 through 1959, there will be a 2% deduction; 1960-64, 2½%; 1965-69, 3%; 1970 and after, 3¼%. These deductions, matched by employer's contributions, go into the central fund out of which all payments are made.

• Several years ago projectionist Local 150 of Los Angeles sponsored legislation to amend the California State Labor Code so as to provide better ventilation in projection rooms. This legislation was adopted and is now a part of the State Labor Code. However, experience during the intervening years has shown that when the wind blows in a certain direction, noxious gases still are blown back into the projection room.

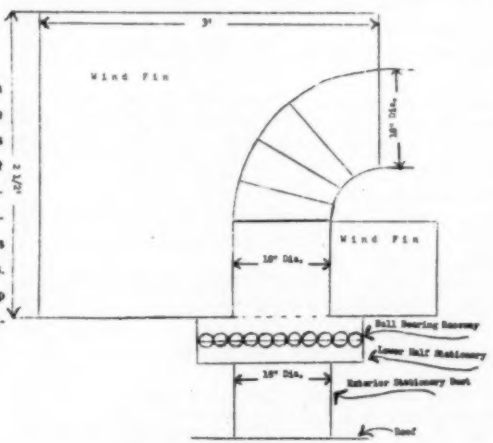
Local 150 is moving to meet this situation by sponsoring a resolution to be presented to the forthcoming conventions of the California State Federation of Labor and the State Theatrical Federation.

Improved projection room ventilation has ever been one of the pet projects of this department, and we are glad to note the vigorous manner in which Local 150 is moving in this situation. So important do we regard such legislation for *all* IA Locals that we are publishing the Local 150 resolution in full. The resolution follows:

WHEREAS: the Labor Code of the State of California adequately provides for the number of cubic feet of air circulation in projection, rewind and generator rooms of moving picture theaters, and,

There is no provision in the State Code to insure that a back draft does not occur, thereby bringing the carbon monoxide back into the projection room, and,

It has been found upon investigation that the prevailing wind, if of great enough velocity and blowing in the direction of the exterior arc lamp exhaust stack, forms an impasse for the exhausted gases creating a



Reproduction of a sketch accompanying the recommendations of Los Angeles projectionist Local 150 for an improved means of exhausting noxious gases from projection rooms. Details of the hookup are given in the accompanying story.

back-draft and bringing the fumes back into the projection room, and,

The installation of automatic funnels, or hoods, at the extremities of the exterior arc lamp exhaust stacks will prevent the return of carbon gases to the projection room. These devices are similar to the funnels used on shipboard to ventilate between decks. The funnels are L-shaped and finned so that the prevailing wind may rotate them 360 degrees. They should be mounted over on ball bearings to allow for ease in rotation: in this manner the funnel is turned away from the direction of the wind, making it impossible for a back-draft to occur. This is an inexpensive installation and would remedy the situation, and,

In drive-in theaters, in most instances, the exterior arc lamp exhaust stack, or duct, is too close to the projection room ventilation intake duct, with the result that the lamphouse exhausted gases are being drawn back into the projection room. The exhaust stacks, or ducts, should extend not less than 25 feet away from the projection room intake duct and be equipped with automatic directional exhaust hoods to correct; now

THEREFORE BE IT RESOLVED that Local 150, International Alliance of Theatrical Stage Employees and Moving Picture Machine Operators of the United States and Canada hereby requests that steps be taken to amend the State Labor Code to provide that directional exhaust hoods be installed on all exterior arc lamp exhaust stacks, or ducts, leading from projection rooms in moving picture theaters, and,

BE IT FURTHER RESOLVED that copies of this resolution be sent to the California State Theatrical Federation, The California State Federation of Labor and that they be requested to use their influence and power with the State Legislature in amending the State Labor Code to improve the ventilation in projection rooms in moving picture theaters as outlined in this resolution.

Respectfully submitted,
JOHN MAYNARD, President
CHAS. A. VENCILL, Secretary-Treasurer
GEO. J. SCHAFFER, Business Manager

• The sudden death of Bruce I. Steinmetz, 65, president for many years of Local 213, Great Falls, Mont., stunned his many friends in the Alliance. Steinmetz was elected last Spring secretary-treasurer of District No. 1, comprising the states of Montana, Idaho, Oregon, Washington and British Columbia, and for the past 19 years he served as president of the Cascade County Trades and Labor Assembly. During World War II he served as a panel member of the War Labor Board in his territory, and was a member of the City Post-War Planning Commission.

Steinmetz had an extensive acquaintanceship with the political leaders in his State, having taken active part in many labor bills inaugurated in Montana.

• If you have any old greeting cards, such as birthday, anniversary, Christmas, Mother's Day, Father's Day, get-well, etc., do not destroy them but send them on to Morris J. Rotker, 1258 College Ave., Bronx 56, N. Y., who turns them over to centers devoted to helping victims of cerebral palsy regain the use of their crippled muscles. These victims are taught to make many ingenious articles with these discarded cards, while at the same time they are exercising their withered limbs. An old-time member of New York Local 306, Rotker may always be counted upon to extend a helping hand to his less fortunate fellow-men.

Bruce I. Steinmetz

• The 32nd biennial convention of the Theatrical Mutual Associations (TMA) was held at the Neil House, Columbus, Ohio, July 9 to 11, inclusive. The delegates were welcomed by representatives of Locals 12 and 386, both of Columbus. Much constructive legislation was adopted at the sessions, with particular attention being paid to an organizing drive for new Lodges in the United States and in Canada. Special attention will be given to the latter area, with the next convention being set for Toronto.

William R. Noon, of New York Lodge 1, was re-elected Grand President, and Phil Hitter, of Long Island, N. Y., Lodge 67 was re-elected Grand Secretary-Treasurer.

The delegates reported that there is an increasing awareness throughout the theatrical crafts of the good work being done by all the TMA Lodges, which promises well for the expansion drive now under way.

• At a luncheon meeting at the Hollywood-Roosevelt Hotel last month with 75 officers and members of the Hollywood IA Locals, President Walsh pledged full support of the International to the Hollywood Locals in their forthcoming contract negotiations with the producers. Although actual negotiations will not begin until October 1 next, President Walsh urged the negotiating committees for the 16 Hollywood Locals to sift through all demands in order to determine those most important to the members as a whole. This, he pointed out, would help to keep major issues uppermost and reduce the danger that actual negotiations would be unduly prolonged, as they were in 1946.

Walsh stated that he planned to be present in Hollywood during the actual negotiations in order to see to it that "we get as much as possible and as quickly as possible from management." He pointed out that wages in the industry have fallen far behind the increased

GRAND LODGE OF THEATRICAL MUTUAL ASSOCIATIONS (TMA) IN 32nd BIENNIAL CONVENTION AT THE NEIL HOUSE, COLUMBUS, OHIO, JULY 9-11 LAST.

Front row (left to right): Robert Glasgow, 4th vice-pres. (Omaha Lodge 7); Phil Hitter, sec.-treas. (Long Island, N. Y., 67); Luke Callahan, 1st vice-pres. (Cincinnati 33); Wm. R. Noon, grand pres. (New York 1); Nat Stein, past grand pres. (Chicago 4); Phil Lynch (Bronx, N. Y. 38); Irving Schlesinger (Long Island, N. Y., 67); Frank Galluzzo (Chicago 4)—all three on the laws and appeals committee;

Center row: George Postel, tiler (Cincinnati 33); Wm. R. Mull, 6th vice-pres. (New York 1); A. W. Fried, 5th vice-pres. (Brooklyn 30); Paul Stahl, 2nd vice-pres. (New York 1); S. Mazzucco, trustee (Chicago 4); M. Torreano, trustee (Pittsburgh 37); H. Blaming, trustee (Brooklyn 30); B. Norton, trustee (Brooklyn 30); C. W. Rockwood, marshal (Toronto 11);

Back row: R. Hostetter, 7th vice-pres. (Hollywood 142); J. Mitchell, trustee (New York 1); J. A. Gallagher, 3rd vice-pres. (New York 1); S. Nicenholtz, trustee (Brooklyn 30); J. Bauman, trustee (New York 1); E. Sullivan (New York 1).

cost-of-living, and that layoffs and unreasonable dismissals of old-timers from their jobs meant that a pension and welfare plan would have to be seriously considered by the producers.

• The members of Laboratory Technicians Local 702, New York City, won a 10% wage increase, retroactive to April 1, 1951. Should the Consumers' Price Index show a cost-of-living increase in April, 1952, the members of Local 702 will receive a further increase. This is in line with the General Motors plan for keeping wages in line with the cost-of-living. John Francavilla, president, headed the Local negotiating committee.

• We received a mixed reaction to the item that appeared in this department last month relative to the Health Insurance Plan (HIP) recently inaugurated by New York Local 306. Under this plan members are entitled to comprehensive medical care from doctors of their own choosing. Of course, like all new projects, HIP has its share of dissenters, some of whom are justified in their complaints, and others who are natural "kickers."

One letter we received stated that the writer was dissatisfied with his choice of doctor. He stated that although he made an appointment for a complete physical check-up, the doctor seemed rather disinterested and, after asking a few questions, gave him a perfunctory examination and suggested another appointment. When the man left the doctor's office he knew no more about the physical ailment which prompted his request for a checkup than he did when he entered it. In our opinion, the member, instead of griping about HIP to all who would listen to him, should have reported the incident to the proper Local officials and then selected another doctor.

From our own personal experience, we can say that the plan is an excellent one as far as it goes, and that as time goes on many of its present kinks will be ironed out.

• One of our old subscribers, Walter Dunkelberger, 1443 Fourth Avenue South, Fargo, N. Dak., is very anxious to obtain copies of the following back issues of IP: November 1948; March, August, September, October 1949; February, April, and October 1950. Walter needs these missing copies to complete his IP files and is willing to pay a reasonable price for them.

• A demand for a 50c-per-hour increase for the members of Local 348, Vancouver, B. C., is a subject for discussion in the negotiations between officials of the Local and the Odeon, Famous Players, and independent theaters. The present scale ranges from $2 to $2.15 per hour, with drive-ins and downtown houses paying the top scale. As usual, the old exhibitor chestnut—the two-man shift—has come up in the discussions.

• George Weidemeyer, 56, member of Local 384, Hudson County, N. J., died several weeks ago after a short illness. Weidemeyer, a member of Local 384 for the past 36 years, was also a member of the 25-30 Club.

• *Recent out-of-town visitors to the offices of IP:* Bert Ryde, business representative, Local 233, Buffalo, N. Y.; Henry J. Benefield, executive board member, Local 568, Columbus, Ga.; J. Gibbons, recording-secretary, Local 182, Boston, Mass.; A. E. Bradshaw, Local 175, Tacoma, Wash.; Charley Hahn, J. E. McAuley Mfg. Co., and National Carbon's Bill Kunzmann.

Eidophore Tv With Color Set for Roxy, N. Y., Oct. 1

Theater Tv rights to the CBS color method for use in its Eidophore system purchased in February from Swiss interests were acquired recently by 20th-Fox. With the acquisition, 20th-Fox will employ the CBS system to bring color Tv to American theaters, with the initial demonstration of the system scheduled for Oct. 1 at the Roxy Theater, New York. It is planned to install the system in all 500 of the National Theaters chain (West Coast). System will also be made available to other theaters.

Ambitious Program Plans

Programming contemplated will be all-live and all-closed circuit, with no films to be used. CBS will not produce program material for the project. Preliminary plans look to the theater networking in color of Broadway plays, with "South Pacific" mentioned as a possible first. Sportswise, 20th-Fox plans colorcasts of top football games or outstanding boxing bouts.

An important phase of programming is expected to be the use of local events from various key cities, such as the aqua-show, or top civic events around the country.

SMPTE Out of FCC Hearings; 'Primary Aims Accomplished'

In announcing that the SMPTE would not appear at the forthcoming (first week in December) F. C. C. hearings on theater Tv, the Society indicated that it is convinced that the matters under consideration at these hearings can be "adequately and informatively handled by the qualified engineering representatives of the motion picture organizations there appearing.

"Present broad interest of the motion picture industry, as well as the constructive measures which the industry now proposes" are evidence that the Society's mission in the present preliminary stages of theater Tv development have been accomplished. The three primary functions of the Society on theater Tv were:

Primary Function of SMPTE

1. Coordinate the varied approaches of individuals and companies toward theater Tv.

2. Establish desirable performance objectives.

3. Arrange for free exchange of information on video band width, number of lines and suitable signal-to-noise ratios.

It was pointed out that the interests of the Society are technical rather than commercial and it does not seek channels for its own use. To avoid creating the impression that the Engineers, who have been active in this field for the greater part of a decade are now stepping aside, the Society has invited the FCC, eight industry organizations and all individual interests to call upon the Society at any time in a search for answers to particular technical questions.

Picture Co. Home Tv Surveys

The impact of home Tv on the movie theater box-office, the topic of numerous "surveys" which in the main disagree radically with one another, is now summed up in two versions by within-the-industry companies. As reported by the *Financial World* (Aug. 8):

"It is obvious that motion picture theater revenues are adversely affected by home installation of Tv sets although there is disagreement as to degree. The trade paper, *Variety*, quotes a Columbia Pictures source that for each 2% saturation of television sets in an area, movie box office receipts are reduced by 1%; while studies by Paramount Pictures conclude that for every 3% of Tv set saturation in an area, gross declines 1%.

The decline in box-office receipts this year from the comparatively television-free year of 1948 is estimated by Columbia at 9.4%. Business in non-Tv areas nevertheless is expected to be better this year. Box-office receipts in July picked up surprisingly in nearly all localities, which may mean that there has been some wearing off of the novelty of Tv."

Du Mont Tv Profits in Sharp Dip

Net profit of Allen B. Du Mont for the 24 weeks ended June 17 was $109,000, with earnings equal to two cents per share after preferred dividends, compared with $1.16 in the 1950 period.

Sales in the first 24 weeks of this year were $25,612,000, compared with $26,786,000.

New RCA Magnetic Recorder-Projector

A NEW 16-mm recorder-projector, providing the first means of directly recording commentary or musical background magnetically on the edge of 16-mm picture film, has been publicly demonstrated by RCA.

The new equipment for the first time makes available the special advantages of magnetic recording and reproduction in many applications of 16-mm film where allowable costs are restricted by the need for only a limited number of prints. It is of equal significance in applications demanding the opportunity for revision or variation of sound treatment without the cost and time involved in laboratory processing.

In addition to recording and reproducing magnetic sound, primary objectives in its development, the new equipment, designated the RCA "400" Magnetic Sound Projector, can also be used to reproduce optically recorded sound.

Recording, Playback, Erasure

Three main features of the equipment make it possible for non-professional users to obtain excellent results in magnetic recording: (1) To record, it is necessary only to turn a switch and talk or play music into a plug-in microphone. (2) After the recording is completed, another control may be set for immediate playback. (3) If revisions are needed or if re-recording of the film is desired, an electronic erase head may be activated by another simple control. A mechanical safeguard prevents accidental erasing.

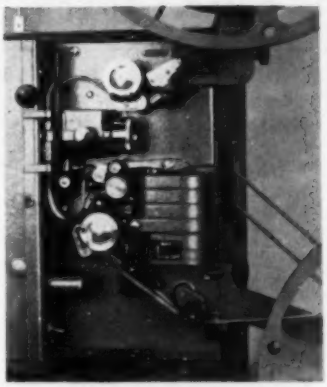
Recording on the RCA "400" Magnetic Sound Projector requires no special preparation or studio facilities. The new method also eliminates the time normally consumed in waiting for processing of a photographic track.

A new film process has removed the last barrier to wide employment of magnetic recording on 16-mm film. A stripe of magnetic oxide one-tenth inch wide can now be coated on the edge of a 16-mm film economically. Moreover, the striping can be placed on the film either before or after it has been used for picture-taking and even if it already has an optical or photographic sound track.

80-to-7200-Cycle Range

RCA asserts that the new equipment achieves a new realism because it permits the recording and reproduction of sound over a frequency range of 80 to 7200 cycles and because background noise is virtually eliminated.

Hailed as the most significant advance in the 16-mm field since the introduction of synchronized sound, the new recording technique is expected to find many applications in films designed for industry, schools, medical education, advertising, military and government agencies, and religious education.



New RCA '400' magnetic 16-mm combination recorder-projector. Magnetic record-and-playback head and optical-reproduce head are both located behind sound drum, above and to the right of lower film sprocket.

For example, a narrative or commentary can be quickly applied to any previously made single-perforation film to which has been applied the magnetic track. The same picture can be presented with two or more different sound tracks, each suited to a particular application, location or type of audience. The preparation of a single subject in several different languages or dialects can be quickly and expertly accomplished.

The cost of recording a 400-foot reel of film with the new equipment has been estimated to be only about one-third of the cost of achieving comparable results photographically. In addition, film waste due to recording errors is eliminated.

Big Biz Mag Tells Us How

Hollywood can win substantial control of Tv if it is willing to risk its money, Fortune Magazine concludes in a survey of Tv in the August issue. Development, however, "may require extensive reorganizations and the disappearance of many of the Old Guard," magazine opines.

Article, titled "Tv's Time of Trouble," declares: "The big story about Tv today is no longer one of irresistible power. It lies rather in the unexpectedly strong bargaining position of Tv's competitors, heretofore given up for lost, and in the equally unexpected weaknesses of the new medium."

Fortune survey holds that the potentialities of video are so enormous that scarcely any limit on its ultimate size can be set. However, high costs, inherent daytime weakness, and the difficulty of crossing time zones on national hookups are predicted as bringing many advertisers back to radio with its less expensive, around-the-clock programs.

"The theater owners, the only group in absolute competition with Tv are marked for slaughter," *Fortune* declares.

Theater Tv is found by Fortune to be "more a delaying tactic than a weapon, for though it can duplicate the coverage of Tv it has no defense against the home comforts of Phonevision." However, article points out, "The exhibitors cannot be jettisoned so long as theater distribution is the only way of financing the $1-million average cost of a grade-A film.

New Order of Things Forecast

Discussing the reluctance of major studios to produce films for Tv, as the networks and independents prepare to fill in the gap, Fortune asserts: "It is clear that Tv's need for film will not be denied just because Hollywood's 'royal families' have barred the gates. As all elemental forces do under restraint, Tv will simply raise a new empire and crown its own kings."

RCA in Theater Tv Color Race

RCA will demonstrate at an early date its theater Tv system which will be "fully compatible" with the black-and-white RCA systems already installed. This indicates that only minor modifications will be necessary to permit full-color reception and reproduction.

In the meantime, it was said, RCA is co-operating with the Tv industry on the formulating of standards for a compatible system to go on the air, in keeping with the standards laid down by the Commission. It was emphasized that the FCC approved a standard, and not necessarily a system, leaving the door open for future acceptance of RCA, or any other color system. Such acceptance, said David Sarnoff, RCA board chairman, would not necessarily be to the exclusion of any other system already approved (CBS mechanical); in fact, Sarnoff declared, he's perfectly willing to meet the competition of any other systems which the FCC would approve side-by-side with the RCA's. "Not only willing, but anxious," he appended.

Tv Set Totals, Compatibility

Sarnoff estimated that there are 13,000,000 sets in operation at present in the U. S., and that there would probably be about 15,000,000 by the end of the year. The fact that these sets could not pick up any signal at all if CBS mechanical color system is the only licensed transmitter should militate against its general acceptance, whereas the RCA all-electronic color system is entirely compatible with present black-and-white receivers, he stressed.

Current IA-IP Amateur Radio Listing

CALL	NAME	LOCAL NO.
W1BCE	C. J. Crowley—L. 459	
W1EBO	Woodrow Guile—L. 459	
W1LW	Norman Soules—L. 459	
W1NZE	Arthur Madsen—L. 182	
W1BHJ	Otto Halquist—L. 182	
W1WI	Tom McNamara—L. 505	
W1BVB	Don Fancher—L. 439	
W1IYY	Harold Wyman—L. 96	
W1JBU	George Gravell—L. 96	
W1BTW	J. Roland Lizotte—L. 546	
W1JWN	Theodore Kahn—L. 86	
W1KKJ	Howard Bruya—L. 505	
W2TSN	Victor Bufis—L. 365	
W2WZX	Erich Pattky—L. 244	
W2CYQ	Frank Larham—L. 108	
W2ARP	Fred Ramhorst—L. 534	
W2NFU	Sydney Trisch—L. 306	
W2RUA	Hugh Newcomb—L. 462	
W2QYQ	Alfred Beckett—L. 462	
W2VSQ	Frank Tamborel—L. 306	
W2OCL	Edward Ricca—L. 306	
W2MYI	Mike Revzin—L. 306	
W2ORS	Charles Roop—L.418	
W2DZA	Alex Knight—L. 353	
W2AOM	Jack Garritson—L. 306	
W2NAJ	Peter Hurgon—L. 306	
W2AMB	Fred Huff—L. 306	
W2ZCE (formerly W3JAX)	John V. Richards—L. 1	
W2RQZ	Frank Lipinske—L. 337	
W2HRJ	Charles Beckett—L. 462	
W2BOR	William Axton—L. 524	
W2HWF	Albert Dietricht—L. 306	
W2BDK	Lloyd Matteson—L. 290	
W2PVB	Kenneth H. Allfrey—L. 290	
W2HP	Jack North—L. 640	
W3KNY	Harris Good—L. 661	
W3MEY	Leo Foran—L. 335	
W3BBV	Nelson Stover—L. 283	
W3JMA	Ralph Rushworth—L. 181	
W3PMY	John Nordine—L. 296	
W3MHE	Charles Gibson—L. 444	
W3BJ	Al Edwards—L. 307	
W3RXT	Bernard Rask—L. 171	
W3TVM	Harry Drew—L. 171	
W4RWN	Bob Cobble—L. 405	
W4HJC	Arlie Belflower—L. 225	
W4MCT	Jim Davis—L. 552	
W4NOM	Buddy Rogers—L. 225	
W4PKT	M. H. Sanders—L. 507	
W4CIU	Bill Britton—L. 537	
W4FGG	Marvin Storler—L. 144	
W4RFF	Howard Ross—L. 574	
W4RMT	E. M. Karcher—L. 482	
W4KBJ	James File—L. 290	
W4MEP	J. Wyatt—L. 793	
W4FGK	D. Holye Knight—L. 412	
W4DPT	Adrian McCroskey—L. 446	
W5IIP	Pat Talbot—L. 249	
W5DYV	Paul Belian—L. 604	
W5CQ	Ray J. Morrow—L. 597	
W5CQQ	Rajmunt J. Machu—L. 597	
W5IMT	A. S. Johnstone—L. 293	
W5ODA	Bill Couse—L. 450	
W5OQJ	Norman Olstad—L. 279	
W5ODA	William Couse—L.450	
W6BAA	Amos Kanaga—L. 409	
W6UZA	Malcomb Keele—L. 150	
W6DPU	Roy Brann—L. 150	
W6PFF	Frank Champlin—L. 150	
W6PQS	Joe Wilson—L. 504	
W6ALO	Tom Jentges—L. 504	
W6GTP	E. Schwartz—L. 695	
W6MTO	Leroy Wardel—L. 762	
W6DYJ	Ed Pothier—L. 215	
W6IV	Delos Trim—L. 297	
W6PB	Dan O'Brien—L. 159	
W6RKB	Bob Gillespie—L. 241	
W6YWC	Lewis Howard—L. 162	
W6EFL	A. H. Whitney—L. 150	
W6EAQ	E. L. Kline—L. 150	
W6CAG	August De Grazia—L. 150	
W6CYW	Frank Hemerlein—L. 150	
W6KNI	Cliff Schwander—L. 150	
W6REH	Harry Gould—L. 150	
W6BPT	Roy Pinkham—L. 431	
W6FBW	Frank Amarantes—L. 431	
W6WPG	Robert Hyde—L. 796	
W6IDY	Dom Lucido—L. 241	
W6EP	Leslie Hewitt—L. 695	
W6HK	Frank Creswell—L. 728	
W6YDU	C. R. Putnam—L. 490	
W6BWI	Harry Morse—L. 297	
W6VTX	Ralph Addy—L. 521	
W6EIR	Leroy Ward—L. 521	
W6ZOK	Max Miller—L. 521	
W6FGV	Norman Owens—L. 521	
W6BEP	C. C. Applegate—L. 187	
W6WPG	Robert Hyde—L. 796	
W6ZEN	Floyd McPherson—L. 709	
W6FOP	George Abrams—L. 297	
W6AGN	Arthur Hansen—L. 297	
W6EWU	Tom Wells—L. 297	
W6YBC	Hansen Cresap—L. 297	
W6ZBX	George Kiaser—L. 297	
W6CZK	Ray Baumann—L. 434	
W6CML	Tom Moore—L. 169	
W6IYT	L. H. King—L. 796	
K6CH	H. H. Quackenbush—L. 510	
W6GCF	Charles Busby—L. 599	
W6HUE	Homer Elias—L. 599	
W6UVO	Edward Ives—L. 150	
W6WER	Clarence Woerth—L. 150	
W6RN	Lynn Bradshaw—L. 162	
W7LAT	Fred Jones—L. 720	
W7PEC	Jim Harford—L. 720	
W7AXY	John Murphy—L. 91	
W7ALM	Chester Lamont—L. 446	
W7FJZ	Z. A. Sax—L. 159	
W7HE	Dee Hart—L. 91	
W7HPF	John Gilbert—L. 91	
W7GXN	Edwin McMurray—L. 180	
W7IIJ	Donald Johnston—L. 401	
W7AVM	J. Elmer Newell—L. 429	
W7JTM	J. Allen Evans—L. 294	
W7OAS	George Olson—L. 294	
W7KMO	James A. Furr—L. 294	
W7FTV	Lloyd J. Hagaman—L. 240	
W8VDP	Jack Harwood—L. 160	
W8BYT	L. Grazier—L. 388	
W8NS	Carl Bacon—L. 199	
W8WSL	Denzel Murphy—L. 239	
W8OWK	Edw. Miller—L. 199	
W8EEW	Muriel Murtagh—L. 291	
W8QIX	F. W. McDonald—L. 199	
W8QFK	Jim Robinson—L. 64	
W8BWU	James T. Smith—L. 100	
W8CHI	C. W. Salchli—L. 315	
W9NLP	Rolly Long—L. 110	
W9OL	W. P. Atchison—L. 323	
W9NPG	John Bain—L. 323	
W9LBL	R. B. Connelly—L. 110	
W9EDW	Harold Nelson—L. 221	
W9RTA	Herb Kleinbeck, Sr.—L. 110	
W9FOL	Merrill Smith—L. 110	
W9AZA	Kenneth Mass—L. 721	
W9GQD	Clarence Hawkins—L. 263	
W9DBY	Kenneth G. Alley—L. 421	
W9VNV	Charles Mitten—L. 194	
W0VGC	H. F. Heckel—L. 230	
W0ZIM	M. Geiskieng—L. 230	
W0GSW	James E. Evans—L. 242	
W0JKU	John Cresap—L. 242	
W0UOP	Clair Rockholz—L. 286	
W0WSH	Herschell Allredge—L. 443	
W0DOL	E. M. Karcher—L. 482	
W0SJK	O. S. Keay—L. 219	
W0SLV	Walker Faussett—L. 395	
W0BTT	R. R. Kerwood—L. 586	
W0WHV	Max Hollingsworth—L. 465	
W0BVO	Paul Hunter—L. 191	
W0QI	E. D. Van Duyne—L. 191	
W0BSO	Don C. Atherton—L. 191	
W0GFN	Ira Hasket—L. 491	
CANADA:		
VE3ABV	Jack Snider—L. 173	
VE3BAK	F. Winkle—L. 173	
VE3BVC	E. H. Whyat—L. 173	
VE3BWG	Lou Lodge—L. 173	
VE3DBF	M. Winslow—L. 461	
VE3OG	H. Horner—L. 173	
VE3TE	Tom Burrows—L. 173	
VE3APR	Harry McClelland—L. 582	
VE5JK	Jack Kyle—L. 295	
VE7OT	M. Thoreau—L. 348	
VE7US	C. Moorehouse—L. 348	
VE7MN	C. H. Richards—L. 348	
VE3AYQ	Cecil D. O'Neill—L. 461	
VE5RJ	Ron Marchant—L. 300	
VE3AHJ	Walt Mann—L. 467	
VE7ALW	Merle Wilson—L. 348	
VE7APN	Jack Stone—L. 348	
VE7APU	Tom Hepple—L. 348	
VE7BJ	Edward S. Brooks—L. 348	
VE7ACB	F. J. McGuire—L. 680	

[NOTE: Additions and corrections should be sent to AMOS R. KANAGA (W6BAA), 262 La Casa Ave., San Mateo, Calif.]

Tv Viewing Difficulty Corrected by B. & L.'s Tele-Ban

By BAUSCH & LOMB OPTICAL COMPANY

NOT so long ago ophthalmologists and optometrists began to notice that an increasing number of patients complained of "difficulty" in viewing television. The severity of this trouble, as reported, ranged anywhere from a sensation of tiredness after several hours of viewing to an inability to tolerate more than a few minutes of watching.

Examinations revealed that many needed corrective lenses. Many others, however, were already adequately corrected or did not require prescription changes. These latter patients posed a new problem. A specific solution, to be prescribed for patient relief, remained to be determined.

Sense and Nonsense

Some professional people arranged Tv-set experiments at home to ferret out the probable cause of their patients' complaints. Various tinted lenses were tested, including several sunglass types. Rules for Tv viewers to follow appeared in papers and periodicals, along with news stories about Tv. Some of the printed material was sound, and some was ridiculous.

Soon we began to receive inquiries as to what we might offer as an answer to the dilemma. Our answer is the new television glass, Tele-Ban, developed specifically for relief of discomfort in Tv viewing, and for giving he wearer crisp, sharp pictures.

X- and Gamma Ray Tests

It should be understood, at the outset, that Tv is not dangerous to the eyes. There are no X- and gamma-ray radiations evident when tested, over a 40-hour period, with health film in contact with the kinescope tube face, and with voltages up to 12 Kv. Discomfort, rather, is compounded of several factors including (*a*) the energy distribution of the source, (*b*) too short an observation distance, (*c*) lack of surround illumination, (*d*) the chromatic aberration of the eye.

One might look at the energy distribution of the kinescope tube, see its similarity to the energy distribution of a daylight fluorescent lamp, and conclude that no cause for investigation existed. But this would not take into account the fact that the daylight lamp illuminates what we see by reflected (and therefore altered) light, whereas we view the kinescope tube directly.

As far back as 1888, Konig and Brodhun studied brightness discrimination at scotopic levels (adjusted to see in a dark environment), and demonstrated higher sensitivity for short-wave light. Crozier and Holway, in 1939, studied brightness discrimination at photopic levels (adjusted to see in a bright environment), in several sizes of test field, with chromatic illuminations, and from their data one can extract the information that sensitivity is highest in the blue, with green and white second, and red the lowest.

The separation for sensitivity levels for blue, green and red is substantial. Hence, the kinescope tube high level of energy at about 440ms (blue) is important, after all. It is responsible for the high energy level in the area where the brightness sensitivity of the eye is greatest.

Viewing Distance Important

Too, many Tv viewers feel that they see the picture better if they hug the screen—one to six feet away. When at an observation distance of about five feet, the short-wave light (blue) and long-wave light (red) are about equally out of focus (because of chromatic aberration), with energy in the blue predominating. (At greater distances the blue is more out of focus.) This fact is recognized and is commonly used in the theater to create a soft, out-of-focus effect by illuminating the scene with blue spotlights. Hence, again, the excess energy in the short-wave portion of the visible spectrum is a source of difficulty.

It does not take much imagination, at this point, to guess that a reduction in the energy in the short-wave part of the spectrum should effectively halt complaint. But, how to do it? Available filters either do not absorb enough, in the right places, or absorb too much. Those that absorb too little do not do the job. Filters that absorb too much, such as Kalichrome C, are harsh; they distort colors, and are worthless for colored Tv. The criterion—absorption of the proper amount of blue with minimum absorption elsewhere—had to be met by a new filter.

After several months of fruitless work with colored glass with proper optical characteristics and additional time spent on coated lenses the solution, in Tele-Ban, was found. Tele-Bans lenses are coated. They are stable. The coating is permanent and as hard as the glass itself. Semi-finished Tele-Ban lenses can be finished in the prescription shop, with no more than normal precaution against scratching.

Tele-Ban is unique and is unlike other selective absorptive lenses. It is designed specifically for the job. Tele-Ban assures comfortable Tv viewing.

The effectiveness of Tele-Bans has been amply demonstrated by field tests and by an intensive user survey. Reports have been enthusiastic: Tele-Bans definitely make Tv viewing more comfortable. When people complain about difficulties in viewing Tv, apart from those produced by ametropia (erroneous refraction of the eye, causing imperfect vision), one can be sure of obtaining relief by the use of Tele-Bans. They will be available generally later this year.

IA-IP Radio Hams Constitute Theater Tv Talent Backlog

By AMOS KANAGA (W6BAA)
Sec. L. 419, San Mateo, Calif.

Activity on the ham bands has been at an all-time low except for the 75-meter phone band which still sparks out with the midnight wisecracks from the boys down South and up around Montana. We often wonder if that years'-old checker game of two IA guys who are well known to the hams will ever be wound up, to the intense disappointment of the dozens of BCL listeners who kibitz right along with them.

Becoming ever more popular with the boys is 75 and 10 mobile. Could this be the reason why a lot of fellows are leaving for work earlier than usual?

Of great importance, we think, to radio hams everywhere is the announcement by President Walsh of the IA's intention of doing a thorough organizing job on the Tv field. For our part, we do not know of a gang more qualified for Tv work than are the radio hams—those technically-qualified men from the IA-IP amateur radio list.

Nice Backlog of Tv Talent

Most certainly there is experience in the electronic field on that list that, with just a little more schooling, could be used to the great advantage of the craft. Perhaps we could profit by going back over those issues of IP which presented basic data anent Tv. After all, the fundamentals of Tv remain pretty much the same, and I doubt whether anybody knowing these fundamentals would have any great trouble in handling any form of theater Tv.

Many thanks to the boys for their many nice letters, and we do try to answer all of them. Keep the suggestions coming. An up-to-date list of IA-IP hams appears in this issue. 73.

Seager in Ansco Sales Post

CHARLES W. SEAGER has been named Eastern Manager of Ansco's professional motion picture sales department, with headquarters in the Chrysler Building, N. Y. City. Seager joined Ansco in 1946, following an extended tour of duty as a Major in the U. S. Signal Corps during World War II. Previously he had been identified with the visual education field.

Networks' Vested (?) Rights in Tv

Stockholders of both companies have approved the merger of American Broadcasting Co. with United Paramount Theaters, in which the latter would exercise dominant control. Next step is to get the approval of the FCC.

Meanwhile, a self-appointed body of people, "acting in the public interest," announced that it would oppose not only the ABC-UP merger but *all* exclusive theater Tv. "Subscription radio was never approved by the FCC," says the Fair Television Practices Committee, heavily weighted as to membership, of course, by lawyers. "No precedent of any kind exists for granting to theater Tv exclusive use of any publicly-owned channels."

FTPC charged that efforts are being made to stampede the motion picture industry into Tv despite doubtful legality, lack of technical proof on ultra high frequencies, and absence of evidence of economic value.

QUERY: Do the Tv networks operate on "publicly-owned" channels for free? Sure, except that the advertiser picks up the gigantic tab the proceeds from which go into network tills, not to any philanthropic enterprise. Moreover, the cost of the Tv network program is figured into the retail (we mean *consumer*) price of the commodity advertised.—ED.

Kodak 16-mm Multi-Speaker

Eastman Kodak has developed a new multi-speaker unit for use with the regular speaker of its Pageant 16-mm sound-film projector. These four widely separated speakers permit considerably greater flexibility in sound reproduction, making it unnecessary for the projectionist to raise the sound volume to such high levels as to impair fidelity.

Each of the speakers in the new unit is an 8-inch speaker mounted in individual baffles. One is supplied with a 35-foot cord; two with 45-foot cords. Assembled together, the three speakers form a convenient carrying case. The complete unit weighs only 17 pounds, and will enclose a 2000-foot reel.

The speakers are equipped with connectors which make it easy to arrange them in the correct electrical hook-up.

Major Company Color Upswing

Another cheering note in the seeming resurgence of motion pictures as the prime source of family entertainment was sounded with the Metro announcement that more than half of its output for the next 12 months will be in Technicolor—color being one of the more important facets of the triumvirate of color, stereophonic sound and three-dimensional pictures which, informed sources hold, will contribute materially to the box-office upswing within the next few years.

RKO, meanwhile, has announced that only 12 of its projected 36 features for the coming year will be in color. This percentage is generally regarded as somewhat low for a so-called major company. Of the next 15 releases from Fox within the next four months, only 4 will be in color.

Theater-Nets Tv War Opens

Indicating a continuous battle between theater Tv interest and the Tv networks for the rights to large-scale sports events, Du Mont has named Tom Gallery to head a new sports department whose special—nay, sole—function will be to sign *and sell* major sports events. Gallery has a background of promoting big-time sports events and, significantly, was moved to his present spot from that of network sales director.

U. S. 'Essential' Job Classification

"Prospects for the motion picture industry or any substantial number of its job classifications being catalogued as "essential industry" are extremely slight, it was suggested bluntly at the U. S. Dept. of Commerce, whose spokesman pointed out that only works immediately associated with industrial production are regarded essential today.

Cleaning Projector Lens

For the benefit of those who may have been misled by the nonsense that has appeared lately in the non-technical press, IP offers here a few basic tips anent the proper care of a projection lens, coated or uncoated, as supplied by Kollmorgen Optical Co.:

1. Remove lens from projector at least once a day for cleaning.

2. Remove all particles of dust or lint with a *clean* camel's hair brush, which should be used only for this purpose.

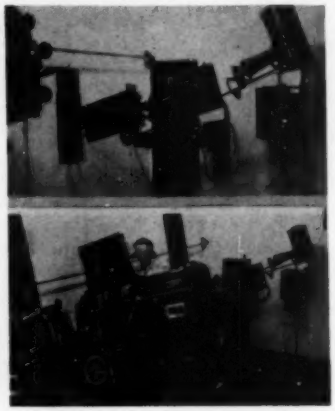
3. Wet sheet of clean "Lens Tissue" in any good liquid lens cleaner similar to the "Guild Craft" lens cleaner, grain alcohol or acetone, and wipe the surfaces gently but thoroughly.

4. Cloths of any character are not recommended for cleaning—use *Lens Tissue*.

5. Dry the surface with a clean dry piece of "Lens Tissue."

6. Never attempt to open Super or Series II Snaplites since they are factory-sealed to eliminate oil seepage.

TYPICAL PROJECTION ROOM IN HOLLAND



Slide projector (top), which utilizes a mercury vapor light source. Over-all room view (bottom).

Letters to the Editor

To the Editor of IP:

Manufacturers of Class A and Class B Products (motion picture equipment is Class B), using over a minimum quantity of controled materials (steel, copper, and aluminum) apply to the National Production Authority for material allocation and DO-Rating to facilitate the purchase of materials in short supply.

The NPA after a study of the request, allocates to the manufacturer certain weights of these materials.

Though Motiograph's request for material allocations for sound and projection equipment was based on a lower than normal production schedule, the NPA allocated for its 4th quarter operation approximately 50% of the materials requested.

If other theatre equipment manufacturers' allotments were similarly low, as there is good reason to believe, then it is certain that equipment is to become scarce by year end. Right now most theatre equipment is in good supply, so it is advisable for the theatre owner to buy now while equipment can be obtained on reasonably good delivery terms.

FRED C. MATTHEWS
Vice-President, Motiograph, Inc.

To the Editor of IP:

Many of my colleagues, no less than I, enjoy your publication very much. We all

(*Continued on page* 28)

BRITISH TRAINING

(*Continued from page* 15)

a theoretical nature must include optics, photometry, sound and acoustics and—a most important topic—regulations.

Projectors, Soundheads

"The practical side is at least as important as the theoretical. Every training centre must be equipped with a variety of old projectors and sound-heads, which the students must dismantle and reassemble, in order to become conversant with the mechanical principles of projection.

"Film handling is a subject that should not be left for instruction in the rewind room; one still sees projectionists making joins in the time-honoured manner of applying the cement, then holding the two ends of the film in mid-air to register the perforations—a method that simply cannot be used with safety base.

"An important aspect that throughout the course must be kept to the fore is showmanship. However good a technician a man may be, he will never make a good projectionist without that touch of showmanship in his make-up. Stage technique must also be touched upon.

Training for the 'Seconds'

"The training for the second projectionist's certificate will be a continuation of the previous training. But the training for the chief should be regarded in a rather different light. Technically, the second should have the same knowledge as the chief, since on the chief's days off he will be in charge. But the chief must be trained to accept responsibility, to offer technical advice to his boss, and to become a prominent figure in the running of his theater. Much of the last year of training should therefore be devoted to consideration of present problems—picture brightness, auditorium lighting, sound quality—and possible future developments—stereoscopy, stereophony, television.

Qualified Teaching Staff

"It may be thought that this syllabus is too ambitious. Certainly it introduces a pressing problem: where are the instructors to be found?

"For the more theoretical subjects — mathematics, electricity, optics — the services of existing technical teachers are virtually necessary. There is far more in teaching than just knowing one's subject—as I learnt during my war-time experience. But I repeat, these teachers, must be prevailed upon to give instruction in an essentially practical manner.

"Unfortunately, few institutes will boast instructors capable of teaching the more practical subjects, such as projection principles, sound-on-film reproduction, film handling, showmanship. For instructors in such subjects we must turn to the industry: projectionists, theatre engineers, equipment engineers, and salesmen. But first, I emphasize, they must be given a course of instruction in the actual job of teaching.

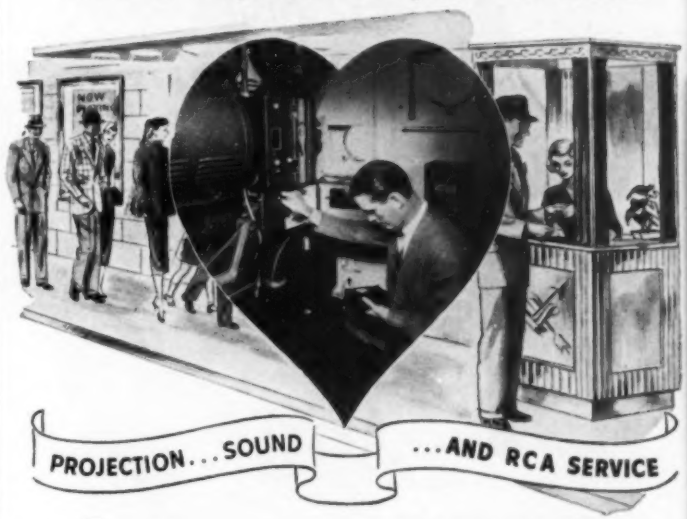
Small-Town Applicants

"Everything I have written previously can apply only to the apprentices and projectionists working in theaters in and around the larger towns. What of the many projectionists in country shows, too far from the nearest town, where the inauguration of training classes for two or three projectionists is quite out of the question?

"The only practical answer to give such men a fair deal is the correspondence course. Provision should be made for such courses to be available without charge to the country apprentice. The apprentice should be allowed the appropriate time from his duties to study the course, and, if possible, a room should be made available to him in the theater."

[ED.'s NOTE: Comment on the foregoing is contained in the Monthly Chat column beginning on page 3 of this issue.]

Give the HEART of your theatre a "Break" ...or it may BREAK your box-office



SCHEDULED INSPECTION check-ups and regular maintenance are more than a "break" for your projection room equipment—*the heart of your theatre.* They are performance security that assure high-quality showmanship for your movie presentations.

Neglect of proper maintenance control results in equipment troubles that seriously interfere with box-office takes.

It costs so little to protect so much

The advantages of RCA Service are yours at a cost so low, a few admissions daily pay for it. *Write for complete information.*

Protect your equipment with RCA service—Constant usage of sound and projection equipment causes wear and tear of critical parts . . . tubes become weak . . . transformers and condensers need to be replaced . . . wiring must be checked. The possible scarcity of new sound and projection equipment . . . even replacement parts . . . makes it important that you protect the life of the equipment you now have.

RCA Parts Plans cover all makes and types of theatre sound equipment, as well as projectors and accessory units. This protection is more vital today than ever before.

RCA SERVICE COMPANY, INC.
A RADIO CORPORATION of AMERICA SUBSIDIARY
CAMDEN, NEW JERSEY

Letters to the Editor

wish that we could see the many wonderful technical developments in America. Each month's issue of IP is eagerly awaited by all of us.

A. ZEHNGEBOTH
Zlil Cinema, Haifa, Israel

New 'Fluid Sound' Phone Pickup

Utilizing the principles of fluid-damping and fluid-coupling, the Fluid Sound Phono Pickup has been introduced by Lindberg Instrument Co., 830 Folger Ave., Berkeley 10, Calif. It consists, essentially, of an actuating arm to which a sapphire-pointed stylus is affixed; a pastic body containing three cells filled with an electrolytic, non-toxic, conducting fluid, and a rubber diaphragm.

In operation, D.C. flows through the three cells in series and is modulated by the record track oscillations (acting through the stylus). The current modulations thus produced cause an output voltage to appear on the center cell electrode. This voltage is then fed in the usual manner to any audio amplifier. Needle-record contact is used only to modulate the externally supplied D.C. voltage as it flows through the fluid.

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STEREOSCOPIC FILMS

(*Continued from page* 14)

the images. This condition can be improved upon by a light condensing system having a cylindrical lens element. Then the light spot becomes oval instead of round.

The Newcomer Anamorphoser

Another method is to introduce an optical device on the camera to compress the images in one direction, and a similar device on the projector to expand them back to normal proportions. Such an optical device is called an "anamorphoser." Several types have been constructed, but it remained for Dr. H. Sidney Newcomer to design one that does not introduce serious aberrations and have other optical handicaps. The Newcomer Anamorphoser is capable of effecting a compression of the image to almost 2/3 and an expansion of about 1½ times.

Among the methods suggested for the employment of a single film to carry the two images is the "beam-splitter" in one form or another. The device has two pairs of mirrors placed in front of the lens and arranged so that the pair on the left will cause the left-eye image to be selected for projection to the screen and the right-hand pair will do the same for the right-eye image.

The beam-splitter is a device that does exactly what its name implies—it splits the light beam into two parts. Hence, the intensity of each part cannot be greater than half of the whole beam. It is a simple device and easy to use.

Beam-Splitter Deficiencies

But in addition to light loss, it has another drawback. The pictures overlap considerably, making it impossible to mask them to a stereoscopic window. The window must be artificially produced by a black border on the screen, usually of velvet, to absorb spill-over light. Another shortcoming: The camera lens works at something less than half the *F* stop setting shown on the lens. This means more than twice the amount of light required for conventional photography.

When it comes to shooting interiors, this added light requirement proves to be an economic disadvantage of the beam splitter method. There is a correspond-

ing light loss in projection, and here the loss is even more significant. Take the loss inherent in the beam splitter, add that to the loss in polarization, and you find that you're getting about one-twelfth the light that you had when you projected the full frame in the conventional way.

Another disadvantage of the beam-splitter is the picture proportions it gives —a narrow and tall picture, certainly inappropriate for stereoscopic representation which is so well suited for panoramic views.

Other Proposed Devices

Another proposed device has dual lenses producing square pictures side by side. There is no light loss in the camera, since two lenses are used and the window for each picture is quite sharp. However, there is considerable loss in projection if the attachment is used on a projector not provided with a special condenser system. If the standard proportions are retained, each image is less than one-fourth the area of the full frame.

Another method which has been proposed for simultaneous projection, is the arrangement of images with one member above the other. Special projectors would be required.

Sequential Frame Projection— The 'Eclipse' System

From time to time, the alternate projection of the members of a stereo pair has also been proposed. In this system, the right eye image, for instance, is projected first, then the shutter interrupts the light beam while the film moves down to position the left eye image. Thus there are periods of flicker that occur at different times for each eye.

If we break this sequence of events down, we find that the first light period has a value of 12.5% of the complete picture cycle. The flicker blade on the projector shutter (considering a two-bladed shutter) gives a dark period lasting 12.5% to be followed by a light period of the same, then a long dark period consuming 62.5% for pull-down and eclipse to permit the other eye to see its image.

If standard sound-film speed of 24 frames a second is used, the resulting flicker is very annoying. Stepping up the projection to 48 frames a second increases flicker frequency twice, but it still is noticeable.

Physiological Effects

There is a physiological effect that is likely to become disagreeably apparent —usually headache or nausea—after a few minutes of viewing pictures projected in this way. A complete period of darkness for one eye, while light reaches the other, will probably always result in visual fatigue, if not in nausea, no mat-

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ter how high, within workable limits, the flicker frequency is brought.

Flicker of low frequency calls for traction on the control muscles of the irises when bright light enters one or both eyes. The rapid occurrence of the transmission of stimuli, first from one eye, then from the other, and the motor messages from the brain to the muscles, delivered in rapid sequence, probably accounts, in part, for the visual discomfort experienced by most people when viewing "eclipse" stereo movies.

Perception of flicker depends upon the intensity of the interrupted light, as well as the flicker frequency. The more intense the light, the higher the frequency must go before flicker fusion is attained. Also, the larger the angular field over which flicker is distributed, the greater the consciousness of flicker. Hence the dimmer the picture and the smaller it is, the lower becomes the flicker fusion frequency.

Projecting 'Eclipse' Stereograms

There are two ways to project and view eclipse stereograms. One is by using rotating or vibrating shutter devices held up in front of the eyes. These are synchronized electrically with the projector. The other method is to employ a rotating polarizer in front of the projector lens and polarizing spectacles for the viewer. In one position the polarizer delivers light through the left spectacle filter, in the other through the right filter.

Alternate frame, or eclipse, projection must have twice the number of frames required for conventional films. That means doubling the length and providing for faster projection speed.

If the alternate frames are photographed alternately, there is a very objectionable fringing in pictures of moving objects. This is a cause of eyestrain, especially in a picture where the action seen by one eye is in quite a different stage of progress than the action seen by the other. Difficulty in fusion invariably results. This combination of disturbing effects caused by flickers out of phase between the eyes and by fusion trouble, limits the appreciation of the eclipse method.

Complete visual comfort can be attained in stereo movies only if the two images are projected simultaneously, if they are rock-steady, if they are of equal brightness, if they are of equal contrast, if they are properly aligned vertically and horizontally, if far distant points are not separated too far in one image from that of the other, and if they are of exactly the same size.

NOTE: IP will present soon, possibly in the next issue, complete technical data on a system for three-dimensional motion pictures which is startlingly simple, eminently practical and truly economical.—ED.

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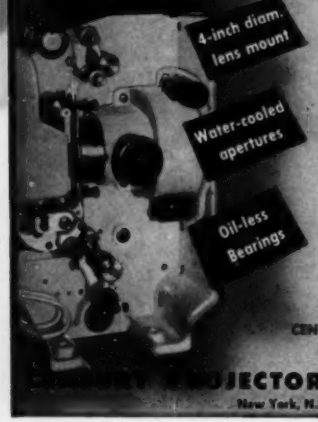

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ALL-PURPOSE FILM LEADER

(*Continued from page* 10)

with the entire content of the leader. In this way the information in it which is not pertinent to the particular use can be ignored and full attention can be given to the useful cues.

Production Footage Cues

For instance, suppose a production director is primarily interested in the footage cues. He may at first see the sound cues too clearly, but once they have become familiar, and he knows they are of no importance to him, they will recede in visual impact and become completely unnoticed.

Familiarity With Pattern

Again, a theater projectionist may be primarily interested in the threading cues and feel that the Tv pattern is confusing; but once he thoroughly understands the pattern, it is of no interest and so diminishes in importance, permitting the useful cues to emerge. Whenever a little time has been allowed for this phenomenon to take place, no permanent objections have been registered.

3.2: Some feeling has been expressed that the leader is "hard to print." As compared with the dupe of a dupe of a dupe sometimes used for the old leader, it is somewhat more difficult. But any good laboratory can do a thoroughly acceptable job without difficulty, and the result is good dressing for a fine printing job.

Dual Standards Avoided

At first there was some feeling that a special Tv leader might be produced which would exist as a special-service standard and leave unmodified the old Academy Leader. At that time major design changes were considered, including 24-frame spacing for the threading cues. However, after long debate by representatives of laboratories and projectionists, it was decided that the problems of dual-purpose release (including reduction printing) and the confusion always resulting from dual standards could be avoided by a proper common-use leader design. Thereafter all the efforts of the Subcommittee were directed toward the production of a leader to fit this policy.

From the beginning excellent cooperation was obtained from producers, laboratories, projectionists and broadcasters, resulting in the issuance on April 19, 1950, of the first sample leader (in card form) for limited comment and criticism. Some two months later these comments were embodied in the first sample leader film intended for actual test use. It was then discovered that the projected visual impact of the footage cues was insufficient to permit good cuing, so the two additional cue frames were added, and that version of the leader was tested with good results.

Samples of the new leader were sent to many organizations. Again the reactions were reasonably approving, except that the Motion Picture Research Council objected on the grounds that the leader would work an undue hardship on theater projectionists.

Projectionist Aid

In order to obtain the reactions of professional theater projectionists to the proposed leader, the services of the Projectionists' Union were enlisted. After several weeks of consideration an en-

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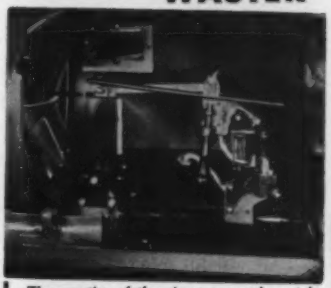

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thusiastic report thereon was received.

Other meetings considered and adopted or rejected proposals received until on March 22, 1951, the Subcommittee decided that the foundations for the new leader had been well established, that the time had come to request that it be publicized to the fullest, with the broadest sort of operational and functional test, directed toward the writing of an official standard. This status report is intended to be the first step in that direction.

When and if the parent Committee decides that the above extensive test may be undertaken, the Subcommittee will canvass by letter the Tv film producers and advertising agencies, requesting that the new leader be used on their special releases. It is hoped, also, that the major feature film producers will cooperate in the test. Certainly in this way all possibilities can be explored and all answers firmly given.

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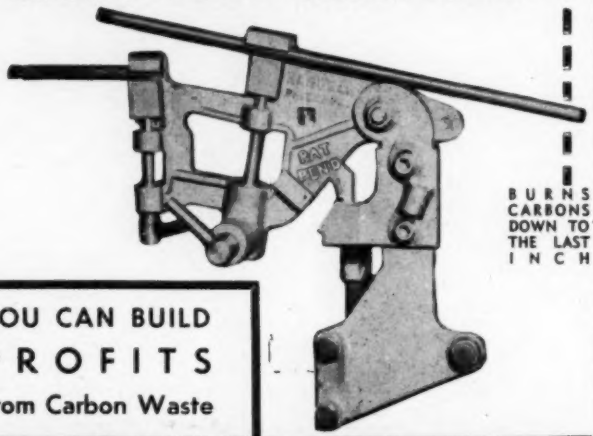

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THE MAGIC OF COLOR

(*Continued from page 6*)

at Technicolor prints, however. For some reason the framelines are printed in silver. When printed too heavily, the framelines fog at the edges and encroach upon the picture area, reducing its height so that framing is extremely critical. In fact, more slight misframes occur with Technicolor than with any other type of print. The projectionist must always be on guard to clear the top or bottom of the picture from the frameline when running Technicolor.

This mischief is almost wholly due to the ill-advised recommendation of the SMPTE regarding the dimensions of the camera aperture. Existing conditions could be improved considerably by using thinner framelines — in other words, larger camera apertures. The present SMPTE standard for the height of the camera aperture is 16 mm (0.63 in.). This should properly be 17 mm (0.67 in.), a fact recognized by certain foreign manufacturers of movies cameras.

Other Tricolor Processes

In addition to the tricolor Technicolor process, two other tricolor subtractive processes appeared commercially in 1932. These are the Agfacolor (German) and Kodachrome (American). Agfacolor is very important in Europe and Asia; but Kodachrome has appeared in theatres only *via* Technicolor prints. Both are variants of a process, first suggested by du Hauron in 1869.

Other and later variants are Ansco-Color (a development of Agfacolor); Technicolor Monopack (development of Eastman Kodachrome), and DuPont's Polymer Color Film. All of these films have three distinct layers of emulsion, each layer made sensitive, either by means of photo-sensitizing dyes or by color-filter layers, to only one of the three primary colors.

du Hauron Specifications

Ducos du Hauron specified a glass photographic plate coated with three emulsion layers. In front there was to be placed a slow, very transparent yellow-dyed emulsion sensitive only to indigo light. Behind this there was to be a moderately transparent magenta-dyed

Cannes Amateur Film Festival

The Ciné Club de Cannes (France) will again sponsor an International Festival of the Film Amateur at the Palais de Cannes from Sept. 8 through the 18th, next. Amateurs throughout the world are invited to participate, with all categories of amateur film being acceptable—8-mm, 9½-mm, and 16-mm, silent or sound. Full details from the Club at 20 Blvd. de Lorraine, Cannes.

emulsion sensitive to emeraude; while the bottom emulsion was to be a cyan-dyed emulsion sensitive to vermilion—the only color passed by the yellow-and magenta-dyed layers.

This process works because, under certain conditions, a photographic emulsion becomes sensitive to the color absorbed by the admixed dye. The color absorbed is, of course, complementary to the color of the dye. Thus, ordinary black-and-white panchromatic films are sensitized to red by mixing certain green dyes with the emulsion.

The exposed plate was developed, reversed, and finally treated with chemicals which "fixed" the dye images which then appeared in full natural color when the excess dye and silver images had been bleached and washed out of the three emulsions.

Triple-Emulsion Film

A variant of this process uses filter layers of dyed gelatine between the three emulsions. The first emulsion, undyed and unfiltered, is a slow "positive" emulsion which is affected only by indigo light. This emulsion therefore furnishes the indigo record. Behind this is placed a layer of yellow gelatine.

Now, yellow transmits both emeraude and vermilion light. But the emulsion directly behind the yellow layer is an orthochromatic emulsion sensitive to all colors except vermilion. Only emeraude affects this emulsion, however, because the yellow layer cuts off the indigo. Between this emulsion and the bottom emulsion there is a layer of vermilion-dyed gelatine. This cuts off all colors except vermilion. The bottom emulsion, being panchromatic, is sensitive to this color.

The processing of this triple-emulsion film is rather complicated. Briefly, it is reversal-processed and then bleached and treated with chemicals which form yellow, magenta, and cyan dye-images by virtue of dye intermediates incorporated into the three emulsions. The end result is a direct positive in natural colors.

Certain variants of the monopack process—Agfacolor in particular—have been so improved in recent years that they are almost as easy to process as black-and-white films. Moreover, the contrast factors of the three emulsions have been equalized to correct the tendency of monopack to appear bluish if slightly underexposed in the camera. This same tendency has been responsible for distinctly blue shadows in scenes photographed in the less perfect monopack systems.

Monopack may be reversal-processed (as is usually done in America) or "straight developed" into a negative having all tones, including the colors, in reverse. From such a negative, monopack positives may be printed with ease and in any desired number. Color values may be balanced in any way desired during the printing process by means of lightly-tinted filters. Like Technicolor, Agfacolor is balanced for the "color temperature" of the high-intensity arc.

Agfacolor, Kodachrome Processes

Certain noteworthy advantages are claimed for modern Agfacolor. It is as simple to use as black-and-white film. It is almost as easy to process—any film laboratory can handle it with only minor modifications in the processing equipment. And because it is a monopack process, registration of the three colors—yellow, magenta, and cyan—is always perfect. A satisfactory sound-track can be printed in dye image. In a word, all the difficult "bugs" of color photography are overcome during the manufacture of the raw stock.

Kodachrome, like Agfacolor, has an indigo-sensitive top emulsion, an emer-

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aude-sensitive middle emulsion, and a vermilion-sensitive bottom emulsion. DuPont Polymer Color Film switches the positions of the indigo- and vermilion-sensitive layers.

The individual emulsion layers are only about 1/10,000 of an inch thick, making monopack only a trifle thicker than ordinary black-and-white film.

Theatre-release prints of Monogram shorts on Ansco Color 35-mm monopack film are familiar to many projectionists in America.

Duplitized Film Stock

No discussion of movie color processes would be complete without a mention of the so-called "duplitized" (double-coated film) processes. With the exception of a few 3-color films prepared by Cinecolor, these are all 2-color processes —Cinecolor, Trucolor, Magnacolor, *etc.*

The two complementary colors used by old-style Technicolor were crimson and aquamarine. The results with this combination were remarkably good, considering the limitations of the 2-color process; but it was impossible to reproduce truly blue sky with 2-color Technicolor. Since the ability to photograph blue sky is a prime requisite for the production of "outdoor" color movies, both Cinecolor and Trucolor have adjusted their set of complementaries to effect this end. Cinecolor, for example, uses vermilion and cyan. (To refresh the memory: vermilion is orange-red, and cyan is a slightly greenish blue.)

There are several ways to photograph and process duplitized films. To produce the 2-color negative, simultaneous 2-frame exposure through vermilion and cyan filters may be made in a split-beam camera as in old-style Technicolor; or two films, one sensitive to red and the other to blue, may be run together in bipack in an ordinary movie camera fitted with double magazines; or a single duplitized color negative may be used. The bipack method has been the most popular.

In a 2-color bipack the negative nearest the camera lens has a regular positive-type emulsion which is sensitive only to blue colors. The back of the film is coated with vermilion-dyed gelatine to act as a filter for the panchromatic film behind it. This latter film thus records only the red-orange colors.

The two negatives are developed to black-and-white, and are used for printing the duplitized release positives photographically. The imbibition process, exclusive with Technicolor, is not used.

Nature of Duplitized Stock

Duplitized raw stock is merely ordinary double-coated positive film except that *both* gelatine "bonding layers" which lie beneath the photographic emulsion, and which serve to make the emulsion adhere firmly to the film-base, are dyed a *deep orange-red.*

Now, the purpose of the red bonding layers is to permit the two sides of the duplitized film to be printed individually. Positive emulsions are insensitive to red; so when one side of the duplitized film is printed, the other side is not affected at all, and is afterwards printed separately. (Or both sides may be printed simultaneously in a duplex picture printer.)

One side is printed from the "red" negative and the other side from the "blue" negative, corresponding frames of the two negatives being superimposed on the duplitized print.

The film is then developed in the ordinary way, coming out as a double-coated, black-and-white film having pictures on both sides. A thorough washing removes the soluble red dye of the binder layers—or at least most of it. If not all of the dye is washed away, the finished print will have an orange tint all over on both sides, as every projectionist knows.

The 'Dye-Toning' Operation

Now for the "dye-toning" operation which puts the color into the duplitized print. After developing, the film is bleached to a silver chloride image. The print is then passed through a special processing machine which transfers toning chemicals to each side. After subsequent washing and drying the print is ready for use. The side printed from the vermilion-exposed negative is toned cyan; the other side vermilion.

The two colors of Cinecolor, Trucolor, and other duplitized prints are oriented so that the blue, or cyan, images are on what would be the normal emulsion side of a standard 35-mm print. This is done so that the soundtrack, printed in blue, will be in correct focus.

Unlike Technicolor's cyanine-blue dye, the blue ferricyanide image on duplitized prints is comparatively opaque to infrared rays, thus making a non-silver soundtrack possible. (Technicolor cyan, however, is a much more "saturated" and accurate color, far superior to metal-organic compounds for the purposes of colored *pictures.*)

[TO BE CONTINUED]

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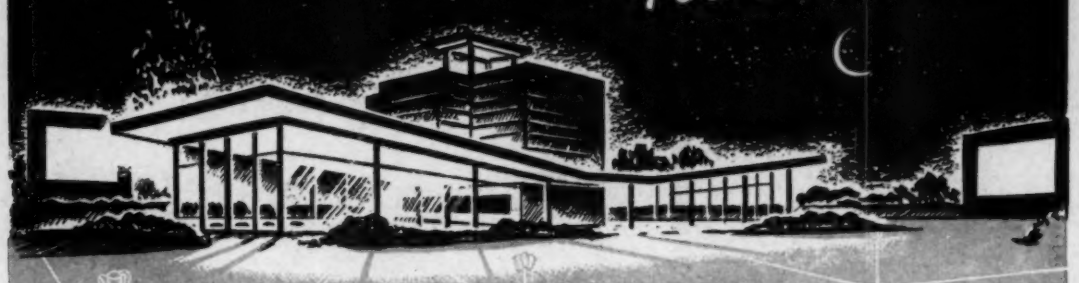

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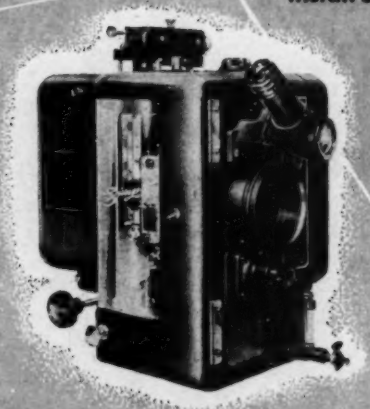

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